DRXTH-AS-LA-328B

INSTALLATION ASSESSMENT OF THE HEADQUARTERS, 172d INFANTRY BRIGADE (ALASKA), FORT WAINWRIGHT, ALASKA
REPORT NO. 328B

B.N. McMaster, J.D. Bonds, B.S. Denahan, E.E. Frey, C.F. Jones, E.A. Knauft, J.B. Sosebee, J.H. Wiese, and K.A. Civitarese

ENVIRONMENTAL SCIENCE AND ENGINEERING, INC.
P.O. Box ESE
Gainesville, Fla. 32602

September 1983

Prepared for:

COMMANDER, HEADQUARTERS, 172d INFANTRY BRIGADE (ALASKA)
Fort Richardson, Alaska 99505

U.S. ARMY TOXIC AND HAZARDOUS MATERIALS AGENCY
Assessments Division
Aberdeen Proving Ground, Md. 21010

INSTALLATION ASSESSMENT

OF

FORT RICHARDSON, AK, AND SUBINSTALLATIONS:
FORT GREELY, AK, AND FORT WAINWRIGHT, AK

Report Nos. 328A, B, C

CONCUR: G H Bethke

G. H. BETHKE
Brigadier General, USA
Commanding

APPROVED: Peter D Hidalgo

PETER D. HIDALGO
Colonel, CmlC
Commanding
US Army Toxic and Hazardous
Materials Agency

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER DRXTH-AS-IA-328B	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Installation Assessment of the Headquarters, 172d Infantry Brigade (Alaska), Fort Wainwright, Alaska		5. TYPE OF REPORT & PERIOD COVERED Final 6. PERFORMING ORG. REPORT NUMBER ESE-328B
7. AUTHOR(s) B.N. McMaster, J.D. Bonds, B.S. Denahan, E.E. Frey, C.F. Jones, E.A. Knauft, J.B. Sosebee, J.H. Wiese, and K.A. Civitarese		8. CONTRACT OR GRANT NUMBER(s) DAAK11-81-C-0093
9. PERFORMING ORGANIZATION NAME AND ADDRESS Environmental Science and Engineering, Inc. P.O. Box ESE Gainesville, Fla. 32602		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS N/A
11. CONTROLLING OFFICE NAME AND ADDRESS Commander Headquarters, 172d Infantry Brigade (Alaska) Fort Richardson, Alaska 99505		12. REPORT DATE September 1983 13. NUMBER OF PAGES 128
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office) U.S. Army Toxic and Hazardous Materials Agency Assessments Division Aberdeen Proving Ground, Md. 21010		15. SECURITY CLASS. (of this report) Unclassified 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE N/A

16. DISTRIBUTION STATEMENT (of this Report)

Distribution limited to U.S. Government Agencies only for protection of privileged information evaluating another command: September 1983. Other requests for this document must be referred to: Commander, Headquarters, 172d Infantry Brigade (Alaska), Fort Richardson, Alaska 99505.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

N/A

18. SUPPLEMENTARY NOTES

N/A

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

An onsite installation assessment was conducted July 26-30, 1982, at the Headquarters, 172d Infantry Brigade (Alaska) at Fort Wainwright (FW) to determine the presence of any toxic or hazardous materials to assess the potential for offpost migration. Based on the findings of this assessment, a field survey was not recommended.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

SUMMARY

An onsite installation survey was conducted July 25 to 30, 1982, at Fort Wainwright (FW), Fort Wainwright, Alaska, to determine past and current use of toxic and hazardous materials, as well as the potential for these substances to migrate off the installation.

Problems identified during the onsite visit to FW include:

1. The explosive ordnance disposal (EOD) area has not been included in the hazardous waste permit application, nor have soils from this area been tested for hazardous residue, as required by U.S. Environmental Protection Agency (EPA) regulations;
2. Petroleum, oils, and lubricants (POL) are improperly stored;
3. Wash racks are not equipped with oil/water separators, as required by Army regulations;
4. Underground storage tanks are not leak tested, as required by Army and EPA regulations;
5. Pesticide storage and mixing areas do not conform to U.S. Army Environmental Hygiene Agency (USAEHA) guidelines;
6. A radiological inventory has not been completed, as required by Army regulations;
7. The Alpha impact area is not posted, as required by Army regulations; and
8. The current Spill Prevention Control and Countermeasure/ Installation Spill Contingency Plan (SPCC/ISCP), prepared in 1976, has not been updated in accordance with state of Alaska regulations.

Based on available geological evidence and information on contaminant sources, offpost migration of contaminants via surface or subsurface waters is not indicated; therefore, no survey by the U.S. Army Toxic and

TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued, Page 2 of 3)

TABLE OF CONTENTS
(Continued, Page 3 of 3)

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS AND ABBREVIATIONS

AAFES	Army and Air Force Exchange Service
ALCOM	Alaskan Command
AQCR	Air Quality Control Region
ARRCOM	U.S. Army Armament Materiel Readiness Command
ASP	ammunition supply point
AVGAS	aviation gasoline
BBL	barrel
BLM	Bureau of Land Management
BLMA	Blair Lakes Maneuver Area
°C	degrees Celsius
CAC	Combined Arms Center
$CaCO_3$	calcium carbonate
cal	caliber
CAMS	Consolidated Aircraft Maintenance Squadron
CB	chemical/biological
CECOM	U.S. Army Communications and Electronics Command
cm	centimeters
CMDR	Commander
COE	U.S. Army Corps of Engineers
CONARC	Continental Army Command
CRREL	Cold Regions Research Engineering Laboratory
DA	Department of the Army
DARCOM	U.S. Army Materiel Development and Readiness Command
DDESB	Department of Defense Explosives Safety Board
DEH	Directorate of Engineering and Housing
DEW	distant early warning
DFAE	Directorate of Facilities Engineering
DIO	Directorate of Industrial Operations
DIS	Defense Investigative Service
DO	dissolved oxygen

DOD	Department of Defense
DPCA	Directorate of Personnel and Community Activities
DPD	Defense Property Disposal
DPDA	Defense Property Disposal Activity
DPTSEC	Directorate of Plans, Training, and Security
DS/GS	direct support/general support
EAFB	Eielson Air Force Base
EEO	equal employment opportunity
EIS	Environmental Impact Statement
EOD	explosive ordnance disposal
EP	extraction procedure
EPA	U.S. Environmental Protection Agency
EPIC	Environmental Photographic Interpretation Center
°F	degrees Fahrenheit
FG	Fort Greely
FORSCOM	U.S. Army Forces Command
FR	Headquarters, 172d Infantry Brigade (Alaska), Fort Richardson
FW	Fort Wainwright
FWAAF	Fort Wainwright Army Airfield
FWMA	Fort Wainwright Maneuver Area
FWS	U.S. Fish and Wildlife Service
g	grams
gal	gallons
g/quarter	grams per quarter
ha	hectares
HE	high explosive
HEAT	high explosive antitank
HEI	high explosive incendiary
HHC	Headquarters and Headquarters Company
IG	Inspector General
in	inches
IIA	Initial Installation Assessment
ISCP	Installation Spill Contingency Plan
JA	Judge Advocate

JTU	Jackson turbidity units
kg	kilograms
kg/quarter	kilograms per quarter
kg/year	kilograms per year
km	kilometers
l	liters
LAAF	Ladd Army Airfield
LAFB	Ladd Air Force Base
LAW	light antitank weapon
lb	pounds
l/month	liters per month
lpm	liters per minute
lpy	liters per year
l/quarter	liters per quarter
m	meters
m^3	cubic meters
MBTU/hr	million British thermal units per hour
MCA	military construction, Army
mCi	milliCuries
MEDDAC	U.S. Army Medical Department Activity
me/l	milliequivalents per liter
mg/l	milligrams per liter
MID	Military Intelligence Detachment
MISO	Management Information Systems Office
ml	milliliters
MLD	million liters per day
mm	millimeters
m^3/min	cubic meters per minute
MOGAS	motor vehicle gasoline
MP	military police
mph	miles per hour
m/sec	meters per second
N	north

NASA	National Aeronautics and Space Administration
NBC	nuclear, biological, chemical
NCO	Noncommissioned Officers
NIPDWR	National Interim Primary Drinking Water Regulations
NPDES	National Pollutant Discharge Elimination System
NRC	U.S. Nuclear Regulatory Commission
NSDWR	National Secondary Drinking Water Regulations
oz	ounces
PAO	Public Affairs Office
PCB	polychlorinated biphenyl
POL	petroleum, oils, and lubricants
ROTC	Reserve Officer Training Corps
RPO	Radiation Protection Officer
RR	recoilless rifle
SJA	Staff Judge Advocate
SOP	standing operating procedure
SPCC	Spill Prevention Control and Countermeasure
STP	sewage treatment plant
SW	south-west
THM	trihalomethanes
TISA	Troop Issue Subsistence Activity
TMP	transportation motor pool
TOW	tube-launched, optically-tracked, wire-command link
TP	target practice
TSP	total suspended particulates
ug/m^3	micrograms per cubic meter
umhos	micromhos
umhos/cm	micromhos per centimeter
USAAG-AK	U.S. Army Advisory Group--Alaska
USACC	U.S. Army Communications Command
USACIDC	U.S. Army Criminal Investigations Command
USAEHA	U.S. Army Environmental Hygiene Agency
USAETL	U.S. Army Engineer Topographic Laboratories

USAF	U.S. Air Force
USAINSCOM	U.S. Army Intelligence and Security Command
USANWTC	U.S. Army Northern Warfare Training Center
USAR	U.S. Army Reserve
USARAL	U.S. Army, Alaska
USASSD	U.S. Army Special Security Detachment
USATHAMA	U.S. Army Toxic and Hazardous Materials Agency
USGS	U.S. Geological Survey
USPHS	U.S. Public Health Service
USSCS	U.S. Soil Conservation Service
UXO	unexploded ordnance
WP	white phosphorus
WTP	water treatment plant

1.0 GENERAL

1.1 PURPOSE OF THE ASSESSMENT

To determine the existence of toxic and hazardous materials and related contamination at the Headquarters, 172d Infantry Brigade, Fort Wainwright (FW), Alaska, emphasizing those substances posing a potential for migration off the installation.

1.2 AUTHORITY

U.S. Army Materiel Development and Readiness Command (DARCOM) Regulation 10-30, Mission and Major Functions of the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA), July 30, 1981.

1.3 INTRODUCTION

1. In response to a letter from the Commander, USATHAMA, requesting the identification of potentially contaminated installations, the Commander, U.S. Army Forces Command (FORSCOM), recommended that FW be included in the Installation Restoration Program.
2. Presurvey instructions were forwarded to FW by letter to outline assessment scope, provide guidelines to FW personnel, and obtain advance information for review by the Initial Installation Assessment (IIA) Team.
3. FW personnel were briefed on the Installation Restoration Program on July 21, 1982, by a USATHAMA representative prior to the onsite installation assessment.
4. Various Government agencies were contacted for documents pertinent to the assessment effort. Agencies contacted include:
   a. National Archives and Records Service, Washington, D.C.
   b. Washington National Records Center, Suitland, Md.

c. Department of Defense Explosives Safety Board (DDESB), Alexandria, Va.

d. U.S. Army Environmental Hygiene Agency (USAEHA), Aberdeen Proving Ground, Md.

e. U.S. Soil Conservation Service (USSCS), Anchorage, Alaska.

f. U.S. Geological Survey (USGS), Denver, Colo.

g. U.S. Environmental Protection Agency (EPA), Environmental Photographic Interpretation Center (EPIC), Vint Hill Farms Station, Warrenton, Va.

h. State of Alaska, Department of Fish and Game, Juneau, Alaska.

i. State of Alaska, Department of Environmental Conservation, Juneau, Alaska.

j. U.S. Army Corps of Engineers (COE), Huntsville (Ala.) District and Alaska District.

k. U.S. Army Engineer Topographic Laboratories (USAETL), Fort Belvoir, Va.

5. The onsite phase of the assessment was conducted from July 26-30, 1982. The information presented in this report is current, as of the date of the onsite assessment. The following personnel from ESE, under Contract No. DAAK11-81-C-0093, were assigned to the IIA Team:

   - Dr. John Bonds, Team Leader
   - Ms. Barbara Denahan, Hydrogeologist
   - Mr. Ernest Frey, Engineer
   - Mr. Jack Sosebee, Chemist
   - Mr. John Wiese, Ecologist

6. In addition to the records review, interviews were conducted with current and former employees. Ground and aerial tours of the installation were made, and photographs were taken.

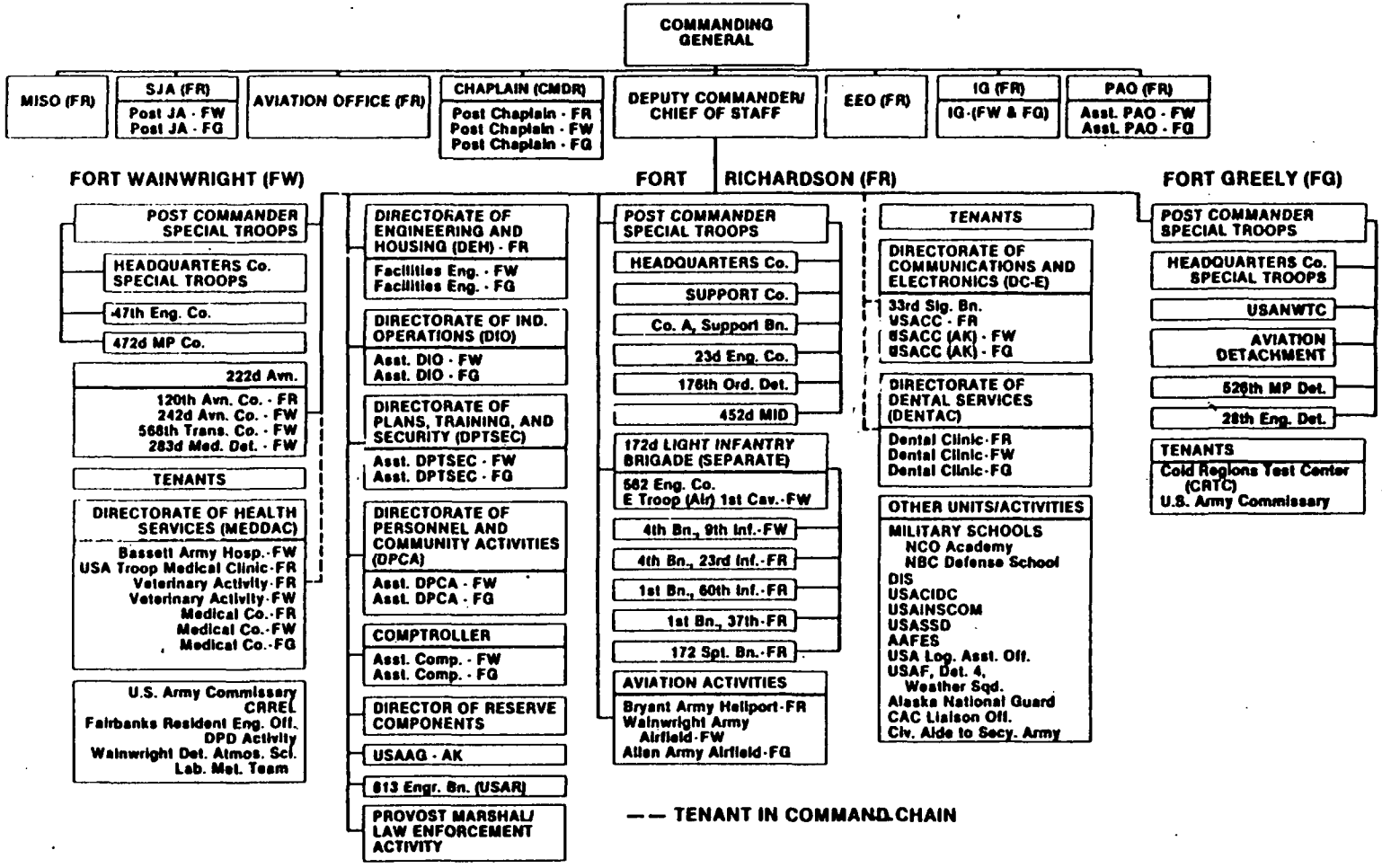
7. The installation assessment focused primarily on those facilities potentially involved in the handling, production, testing, and disposal of toxic and hazardous wastes.

1.4 CURRENT INSTALLATION ORGANIZATION

FW, a FORSCOM installation, is organized as a subinstallation of the Headquarters, 172d Infantry Brigade (Alaska), Fort Richardson (FR). As organized under the 172d Infantry Brigade (Alaska), the principal staff offices are located at FR. The organization chart for the 172d Infantry Brigade (Alaska), indicating the reporting relationships and physical locations of various units and activities, is shown in Fig. 1.4-1.

Subdirectorates of FR, located at FW, which produce, handle, or dispose of toxic/hazardous materials, and their areas of responsibility, include (FR, 1982):

1. Directorate of Engineering and Housing (DEH) [formerly the Directorate of Facilities Engineering (DFAE)]--The facility engineer at FW directs and coordinates engineering, construction, operation, maintenance, and repair of buildings, grounds, and utilities functions under the program direction and technical supervision of DEH-FR.
2. Directorate of Industrial Operations (DIO)--The Assistant DIO-FW advises and assists the Post Commander and assigned, attached, and tenant units and activities in matters related to logistics programs and operations. General supervision is provided to the following activities, operating under policies and procedures outlined by DIO-FR: Troop Issue Subsistence Activity (TISA), ammunition supply, consolidated property, laundry and drycleaning services, arctic training equipment pool, transportation, retail petroleum operations, food services, and the installation maintenance facility.
3. Directorate of Plans, Training, and Security (DPTSEC)--The assistant DPTSEC-FW advises and assists the Post Commander on all DPTSEC matters. Performs all DPTSEC functions to include plans and operations; nuclear, biological, chemical (NBC) training; budget; and intelligence/security functions.



MISO	*Management Information Systems Office*	CRREL	*Cold Regions Research Engineering Laboratory*	DIS	*Defense Investigative Service*
SJA	Staff Judge Advocate	DPD	Defense Property Disposal	USACIDC	U.S. Army Criminal Investigation Command
JA	Judge Advocate	USAAG-AK	U.S. Army Advisory Group - Alaska	USAINSCOM	U.S. Army Intelligence and Security Command
CMDR	Commander	USAR	United States Army Reserve	USASSD	U.S. Army Special Security Detachment
EEO	Equal Employment Opportunity	MID	Military Intelligence Detachment	AAFES	Army and Air Force Exchange Service
IG	Inspector General	USACC	U. S. Army Communications Command	USAF	United States Air Force
PAO	Public Affairs Office	NCO	Noncommissioned Officer	CAC	Combined Arms Center
MP	Military Police	NBC	Nuclear, Biological, Chemical	USANWTC	U.S. Army Northern Warfare Training Center

SOURCE: ESE, 1982.

Figure 1.4-1
ORGANIZATION CHART, HEADQUARTERS, 172D INFANTRY BRIGADE (ALASKA)

Prepared for:
U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland

Provides supervision over training aids subcenter and a range central facility.

4. Directorate of Personnel and Community Activities (DPCA)--Advises and assists the Post Commander, FW, on matters pertaining to personnel management and administration. Supervises all DPCA functions at FW as directed by DPCA-FR.

Tenants on FW which handle, produce, or dispose of toxic/hazardous materials and their responsibilities include:

1. Directorate of Health Services [U.S. Army Medical Department Activity (MEDDAC)]--Serves as the principal advisor to the Commander, 172d Infantry Brigade (Alaska) on matters pertaining to delivery of health care services and environmental health services. Exercises technical supervision of all medical facilities, including veterinary, under the 172d Infantry Brigade (Alaska).
2. Dental Clinic--Provides dental care to all eligible personnel.
3. 222d Aviation Battalion--Trains, provides for, and maintains assigned units in a state of readiness to accomplish missions assigned to the Brigade in accordance with current operating procedures and contingency and operations plans.
4. Defense Property Disposal Activity (DPDA)--Responsible for the classification and storage of surplus and scrap properties generated by FW, Fort Greely (FG), and Eielson Air Force Base (EAFB) and effects proper disposal.

Assigned troop units include:

4th Battalion, 9th Infantry
C Battery, 1/37th Field Artillery
E Troop, 1st Cavalry
120th Aviation Company
242d Aviation Company
283d Medical Detachment

568th Transportation Company
47th Engineers Company

Other activities/units/tenants include:

Cold Regions Research Engineering Laboratory (CRREL)
Defense Investigative Service (DIS)
Fairbanks Resident Engineer Office
Army Post Exchange
U.S. Army Instructor Detachment Reserve Officer Training Corps (ROTC)
U.S. Army Criminal Investigation Command (USACIDC)
Meteorological Team, FW Detachment
U.S. Army Communications Command (USACC)

1.5 INSTALLATION HISTORY

1.5.1 GENERAL HISTORY

In 1939, Ladd Army Airfield (LAAF) was established. In September 1942, LAAF had an important role in the implementation of the wartime lend-lease program as a crew-transfer point for conveying various types of military aircraft to Russia.

On Sept. 18, 1947, LAAF was redesignated Ladd Air Force Base (LAFB). Its early missions were to serve as a resupply and maintenance base for the remote distant early warning (DEW) sites and an experimental station in the Arctic Ocean (COE, Alaska District, 1979a).

During this same period, changes were occurring in the Army's command structure in Alaska. The Alaskan Command (ALCOM) was formed Jan. 1, 1947, to serve as overall command for military troops in Alaska. Army troops remained under direct control of the Alaskan Department, which

was reorganized on Nov. 15, 1947, as the United States Army, Alaska (USARAL).

In the 1950s, LAFB served as part of the wartime defense network during the Korean Conflict. In 1955, the Yukon Command, USARAL assumed control of LAFB.

Indicative of the growth of the military in Alaska during the late 1940s and 1950s was the construction of a petroleum pipeline between the city of Haines and FW. A civilian firm began construction in 1954, and the 1,007-kilometer (km), 20-centimeter (cm) line was accepted by USARAL in October 1955. In 1963, six additional pump stations were added and increased the pipeline flow capability from 17,000 to 27,000 barrels (BBL) per day. Further pipeline expansions came with the dedication of the Army's second Alaska pipeline in 1967. This line carried 24,000 BBL daily of petroleum between Whittier and Anchorage (FR). As part of economy measures directed by the Department of the Army (DA) in 1971, 691.2 km of the Haines-FW petroleum pipeline were inactivated and placed on standby status. After further closings of pipeline sections, only the 43.2-km FW-EAFB section was retained in service (FR, 1976).

In 1958, Nike Hercules missiles were assigned to aid in the air defense of Alaska. The 2d Missile Battalion, 562d Artillery (manned by units at Fairbanks, EAFB, and what was to become the FW area) fired the first Nike Hercules from an actual operational site in December 1959.

What is known today as FW was established on Jan. 1, 1961, at the site of LAFB. Its creation transferred all operations to the U.S. Army; USAF operations were combined with those of EAFB. Major units located at FW were Yukon Command Headquarters; 1st Battle Group, 9th Infantry; and the 2d Missile Battalion, 562d Artillery. Later in 1961, FW served as a base for helicopter activities.

In July 1963, reorganization of USARAL combat units allowed formation of two separate mechanized infantry brigades, one at FR and one at FW. The FW 171st Infantry Brigade (Mechanized) contained the following units: 1st Battalion (Mechanized), 47th Infantry; 4th Battalion, 9th Infantry; 2d Battalion, 15th Artillery; Company A, 40th Armor; 559th Engineer Company (Combat); and Headquarters and Headquarters Company (HHC), 171st Infantry Brigade (FR, 1976).

Units at FW joined in "Operation Helping Hand" to provide emergency relief and cleanup operations following the largest earthquake recorded in North America that caused extensive damage throughout south-central Alaska. FW did not sustain any damage, but damage on FR was estimated at $17,000,000.

During the Vietnam Era, one infantry battalion from FW (4th Battalion, 9th Infantry) served in Vietnam. This unit was later replaced at FW by the 6th Battalion, 9th Infantry. Also during this period, the Yukon Command designation was officially discontinued.

By 1970, USARAL was affected by Army-wide reductions, closures, realignments, and consolidations. Two missile batteries in the FW-Fairbanks-EAFB area were inactivated. This later involved excessing 245,971 hectares (ha), termed the Nike Range Extension.

Throughout the early 1970s, the Army continued worldwide strength reductions, including inactivation of the 808th Engineer Battalion and the 171st Infantry Brigade at FW. Further Army reorganization following expiration of military conscription on June 30, 1973, abolished the Continental Army Command (CONARC) and created FORSCOM. By Dec. 31, 1974, USARAL was discontinued as a major subordinate Army Command, as the Headquarters, 172d Infantry Brigade (Alaska) assumed command and control in Alaska (FR, 1976).

FW is currently comprised of 371,239 ha for use in its mission to train soldiers and test equipment in arctic conditions.

1.5.2 ARCHAEOLOGICALLY AND HISTORICALLY SIGNIFICANT AREAS

There are no historical or archaeological sites on FW nominated for inclusion or currently included in the National Register of Historic Places. However, the Fairbanks area includes archaeological sites where hunting and fishing camps were established. As reported by COE, Alaska District (1979a), a survey of the Fairbanks area was conducted in 1979 to determine the archaeological significance of FW.

1.6 ENVIRONMENTAL SETTING

1.6.1 LOCATION

FW is located on the eastern edge of the city of Fairbanks in the Tanana River Basin of interior Alaska (Fig. 1.6-1). The reservation includes a cantonment area, range complex, and two maneuver areas.

The cantonment area consists of 1,811 ha, including the North and South Posts and LAAF. The cantonment area adjoins the eastern edge of Fairbanks and lies north of the Range Complex. The 3,573-ha range complex is located between the cantonment area and Tanana River; it is separated from the cantonment area by Richardson Highway running east-west through the reservation.

The Blair Lakes Maneuver Area (BLMA) consists of 260,089 ha, delineated by the Tanana River in the north and east and by the Wood River in the west; its southern boundary follows a straight line through taiga, marshes, and Blair Lakes.

The second Maneuver Area (FWMA), located between the Chena and Salcha Rivers southeast of the cantonment area, contains 103,598 ha. Formerly known as Yukon Command Training Site, this maneuver area extends

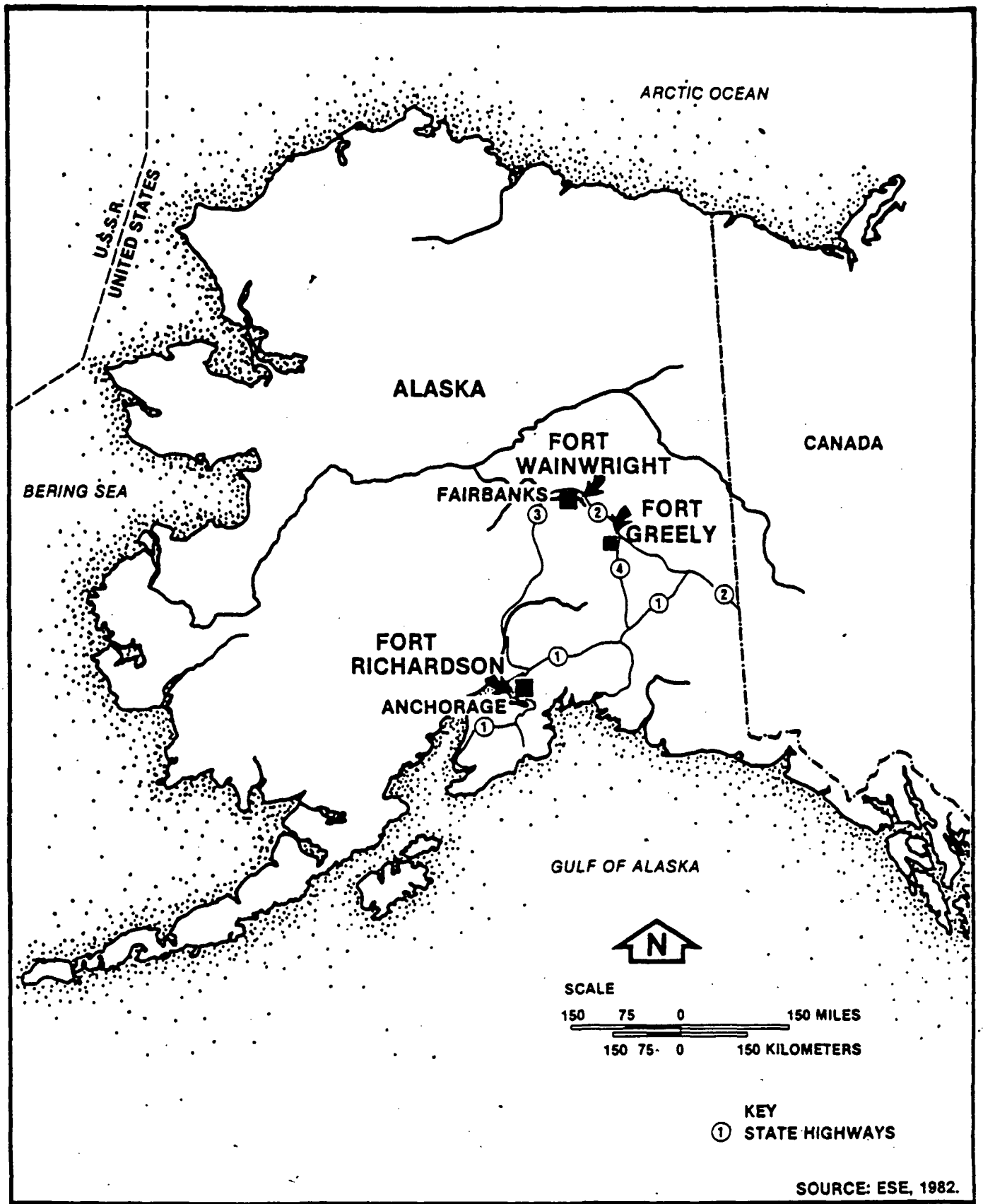


Figure 1.6-1
LOCATIONS OF ARMY INSTALLATIONS UNDER THE 172D INFANTRY BRIGADE (ALASKA)

Prepared for:
U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland

eastward from EAFB. The locations of the cantonment area, range complex, BLMA, and FWMA are shown in Fig. 1.6-2.

1.6.2 METEOROLOGY

FW is located in a continental subarctic climate zone characterized by great diurnal and annual temperature variations, low precipitation, low humidity, short moderate summers, long cold winters, great seasonal contrasts in light duration, and low incidence of cloud cover (FR DEH, 1979c).

The mean annual temperature is -3.5 degrees Celsius (°C) [25.7 degrees Fahrenheit (°F)], and monthly mean temperatures range from -24.4°C (-11.9°F) in January to 15.9°C (60.7°F) in July. Extreme temperatures of -51.7°C (-61°F) and 35.6°C (96°F) have been recorded.

The mean total precipitation is 28.5 cm [11.2 inches (in)], with 16.7 cm (6.6 in) of the precipitation occurring as rain during the summer (June through September). The mean total precipitation includes 177 cm (69.7 in) of snow.

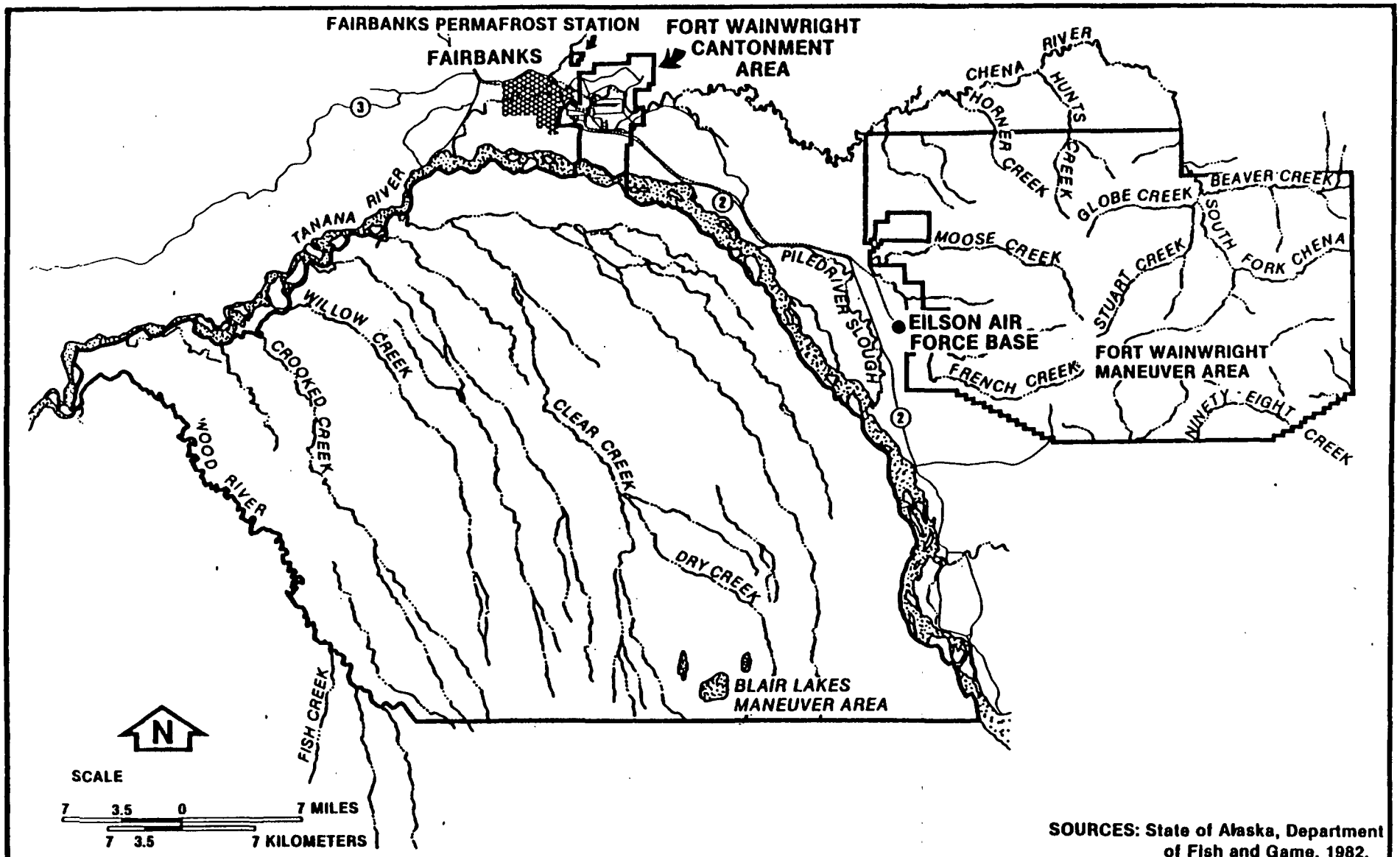
Prevailing airflow in the area is from the north. Mean wind speeds range from 1.2 to 3.4 meters per second (m/sec) [2.7 to 7.6 miles per hour (mph)].

Annual and monthly summaries of climatological data for Fairbanks International Airport are presented in Table 1.6-1.

1.6.3 GEOGRAPHY

Physiography

The western sections of FW, including the cantonment area, range complex, and BLMA, are located in the Tanana-Kuskokwin Lowlands of central Alaska, adjacent to and south of the city of Fairbanks. The main reservation, divided into a northern section (cantonment area and range complex) and southern section (BLMA) by the Tanana River, is



SOURCES: State of Alaska, Department of Fish and Game, 1982.
ESE, 1982.

Figure 1.6-2
SITE MAP OF AND SURFACE DRAINAGE ON FORT WAINWRIGHT

Prepared for:
U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland

Hazardous Materials Agency (USATHAMA) was recommended. However, the following actions by FW were recommended (keyed to conclusions):

1. Bring the EOD area into compliance with EPA regulations;
2. Properly store POL;
3. Bring wash racks into compliance with Army regulations;
4. Test underground POL storage tanks on a periodic basis for leakage;
5. Properly store pesticides;
6. Conduct a radiological survey;
7. Post the Alpha impact area, as required by Army regulations; and
8. Continue efforts to upgrade the SPCC/ISCP.*

* Since the site visit, the Alaska District of the U.S. Army Corps of Engineers (COE) has been contracted to update the SPCC/ISCP. Completion is anticipated prior to October 1983.

Table 1.6-1. Meteorological Normals, Means, and Extremes at the Fairbanks International Airport

Parameter*	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Normal Daily Maximum Temperature	-2.2	9.3	23.3	40.4	58.8	70.7	71.8	65.8	54.4	33.5	11.7	-1.5	36.3
Normal Daily Minimum Temperature	-21.6	-14.3	-4.3	17.3	35.7	47.2	49.6	44.9	34.4	16.9	-6.2	-19.3	15.0
Monthly Mean Temperature	-11.9	-2.5	9.5	28.9	47.3	59.0	60.7	55.4	44.4	25.2	2.6	-10.4	25.7
Record Highest Temperature	38	43	51	65	81	96	89	85	80	65	46	42	96
Year of Occurrence	1965	1970	1970	1973	1964	1969	1968	1966	1963	1969	1970	1969	June 1969
Record Lowest Temperature	-61	-56	-46	-21	-1	37	37	30	11	-15	-43	-56	-61
Year of Occurrence	1969	1968	1964	1964	1964	1970	1964	1965	1972	1965	1964	1964	Jan. 1969
Normal Total Precipitation	0.60	0.53	0.48	0.33	0.65	1.42	1.90	2.19	1.08	0.73	0.66	0.65	11.22
Maximum Monthly Precipitation	1.92	1.75	2.10	0.84	1.67	3.52	4.35	6.20	3.05	1.84	3.32	2.29	6.20
Year of Occurrence	1957	1966	1963	1967	1955	1955	1962	1967	1960	1970	1970	1970	Aug. 1967
Minimum Monthly Precipitation	0.01	0.07	T	T	0.07	0.19	0.40	0.40	0.15	0.08	T	T	T
Year of Occurrence	1966	1958	1968	1969	1957	1966	1957	1957	1968	1954	1953	1969	Dec. 1969
Maximum Precipitation in 24 Hours	0.58	0.97	0.92	0.31	0.88	1.52	1.63	3.42	1.21	0.68	0.84	1.25	3.42
Year of Occurrence	1968	1966	1963	1965	1955	1955	1962	1967	1954	1970	1970	1968	Aug. 1967
Mean Total Snowfall	10.9	10.2	7.6	3.8	0.8	T	0.0	T	1.2	9.4	13.2	12.7	69.8
Maximum Monthly Snowfall	26.3	43.1	29.6	11.1	4.7	T	0.0	T	7.8	24.2	54	33.5	54.0
Year of Occurrence	1957	1966	1963	1967	1964	1953	—	1969	1972	1961	1970	1965	Nov. 1970
Maximum Snowfall in 24 Hours	9.4	20.1	12.6	4.9	4.5	T	0.0	T	7.0	7.6	14.6	14.7	20.1
Year of Occurrence	1968	1966	1963	1962	1964	1953	—	1969	1972	1970	1970	1968	Feb. 1966
Mean Relative Humidity at 2 p.m.	68	61	52	47	38	40	50	54	50	66	72	67	55
Mean Wind Speed	2.7	3.9	4.9	6.5	7.6	6.78	6.4	6.0	6.0	5.3	3.9	3.1	5.3
Prevailing Wind Direction†	N	N	N	N	N	SW	SW	N	N	N	N	N	N
Fastest Wind Speed	29	33	40	31	31	30	29	34	29	40	35	37	40
Year of Occurrence	1954	1955	1970	1965	1955	1971	1957	1954	1971	1958	1970	1970	Mar. 1970

Table 1.6-1. Meteorological Normals, Means, and Extremes at the Fairbanks International Airport (Continued, Page 2 of 2)

Parameter*	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Mean Number of Clear Days	10	7	9	6	4	3	3	2	5	4	7	7	67
Mean Number of Partly Cloudy Days	6	6	7	7	10	10	8	7	6	5	5	6	83
Mean Number of Cloudy Days	15	15	15	17	17	17	20	22	19	22	18	18	215
Mean Number of Days with Precipitation 0.01 in or More	7	7	6	5	6	10	12	13	9	10	9	8	102
Mean Number of Days with 1 in or More of Snowfall	3	3	3	1	†	0	0	0	†	4	4	4	22
Mean Number of Days with Thunderstorms	0	0	0	0	†	2	2	1	†	0	0	0	5
Mean Number of Days with Heavy Fog	5	2	1	†	†	†	1	2	2	2	1	4	20
Days with Temperature:													
70° and above (maximum)	0	0	0	0	3	19	20	9	2	0	0	0	51
32° and below (maximum)	31	26	22	7	†	0	0	0	†	18	28	30	162
32° and below (minimum)	31	28	31	28	†	0	0	1	9	29	30	31	226
0° and below (minimum)	29	23	19	2	8	0	0	0	0	4	19	26	122

T = Trace, an amount too small to measure.
— = No recorded snowfall in July.
N = North.
SW = Southwest.

* Unless otherwise indicated, dimensional units used are: temperature in degrees Fahrenheit; precipitation, including snowfall, in inches; wind movement in miles per hour; and relative humidity in percent.
† The prevailing direction for wind in the Normals, Means, and Extremes table is from records through 1963.
** Less than one-half day.

Source: FR DEH, 1979c.

located in the flood plains of the Tanana and Wood Rivers. The terrain consists of generally flat lowlands, with flat to gently rolling surfaces covering about 94 percent of these areas. Elevations range from 111 meters (m) along the Tanana River in the westernmost area to 290 m above sea level along the southern boundary near Blair Lakes. The surface drainage from FW's northern and southern sections flows into the Tanana River and, to a lesser degree, into the Wood River.

FWMA, located east of BLMA and adjoining the eastern edge of EAFB, is in the Yukon-Tanana Uplands east of the Tanana River. Approximately 20 percent of FWMA consists of flat to gently rolling plains, with the flattest area located in the western portion. Gently rolling to rolling plains cover 10 percent of FWMA; rounded to flat-topped hills cover 70 percent of this maneuver area. Elevations on FWMA range from 160 m above sea level in the northwest along the Chena River, to 995 m above sea level near the eastern boundary. Surface drainage flows northward into the Chena River, westward into the Tanana River, and southward into the Salcha River.

In contrast to the western sections, only small wetland areas are located in the northwestern corner of FWMA. Due to higher elevations and sharper relief, the vegetation cover is dominated by mixed coniferous and deciduous forests; deciduous scrub and wetlands predominate on the western sections.

Surface Hydrology

The northeast portion is drained by the Southfork and its tributaries, Beaver Creek and Stuart Creek, which flow into the Chena River and then into the Tanana River (Fig. 1.6-2). The west and southwest portions are drained by Moose Creek, French Creek, and the Little Salcha River, which flow directly into the Tanana River. The southeast portions are drained by the Ninety-Eight Creek, which flows into the Salcha River and then into the Tanana River.

Low flows occur during the winter, when precipitation is stored as ice and snow. During these months, flows are sustained by ground water inflows. Peak flows occur during summer months when rainfall is augmented by the melting of snow and ice. Table 1.6-2 presents mean monthly discharges for the Salcha, Chena, and Tanana Rivers.

1.6.4 GEOHYDROLOGY

Geologic Setting

FW is underlain primarily by Precambrian Birch Creek schist (FR DEH, 1979b, 1979c). The area has not been glaciated, but glaciers approached within 80 km. During the Quaternary glacial advances, several hundred meters of glacial material were deposited in the Fairbanks-FW area by the heavily loaded Tanana River (Peive, 1954). Most of the area is covered by a mantle of silty micaceous loess derived from outwash plains of the Tanana River (FR DEH, 1979b, 1979c). The mantle ranges from 12 to 30 m deep in valleys to a few centimeters deep on ridge tops.

A few hills of Devonian and Mesozoic basement rocks protrude from the alluvium (Miller and Dobrovolny, 1959). Fig. 1.6-3 is a generalized geologic map, while Fig. 1.6-4 is a cross section of the lithology derived from available well logs and foundation borings.

Seismic activity is greater in Alaska than in other portions of the United States, but only a few shocks have caused extensive damage in Alaska due to the absence of large population centers. The locations of earthquake epicenters at FW are shown on Fig. 1.6-5.

Soils

The distribution of soil types is presented in Fig. 1.6-6, and characteristics of these soils are described in Table A-1, App. A. Four general soil associations exist. Silt loams comprise the greatest portion of the installation. The upland area north of the Tanana River is covered by silt loams occurring from 51 cm to many meters thick over

Table 1.6-2. Mean Monthly Discharge for the 1974 Water Year (October 1973 to September 1974) for the Major Rivers Draining FW

Month	Flow, m^3/min		
	Salcha River Near Salchaket	Chena River Near North Pole	Tanana River at Fairbanks
October	1,884	989	15,291
November	826	530	11,531
December	469	370	8,879
January	291	253	6,823
February	146	138	5,449
March	109	90.9	5,267
April	177	335	7,187
May	4,652	2,628	31,007
June	2,506	1,337	46,841
July	2,557	1,390	77,016
August	3,330	1,509	77,916
September	1,843	1,279	46,366

m^3/min = cubic meters per minute.

Source: FR DEH, 1979b.

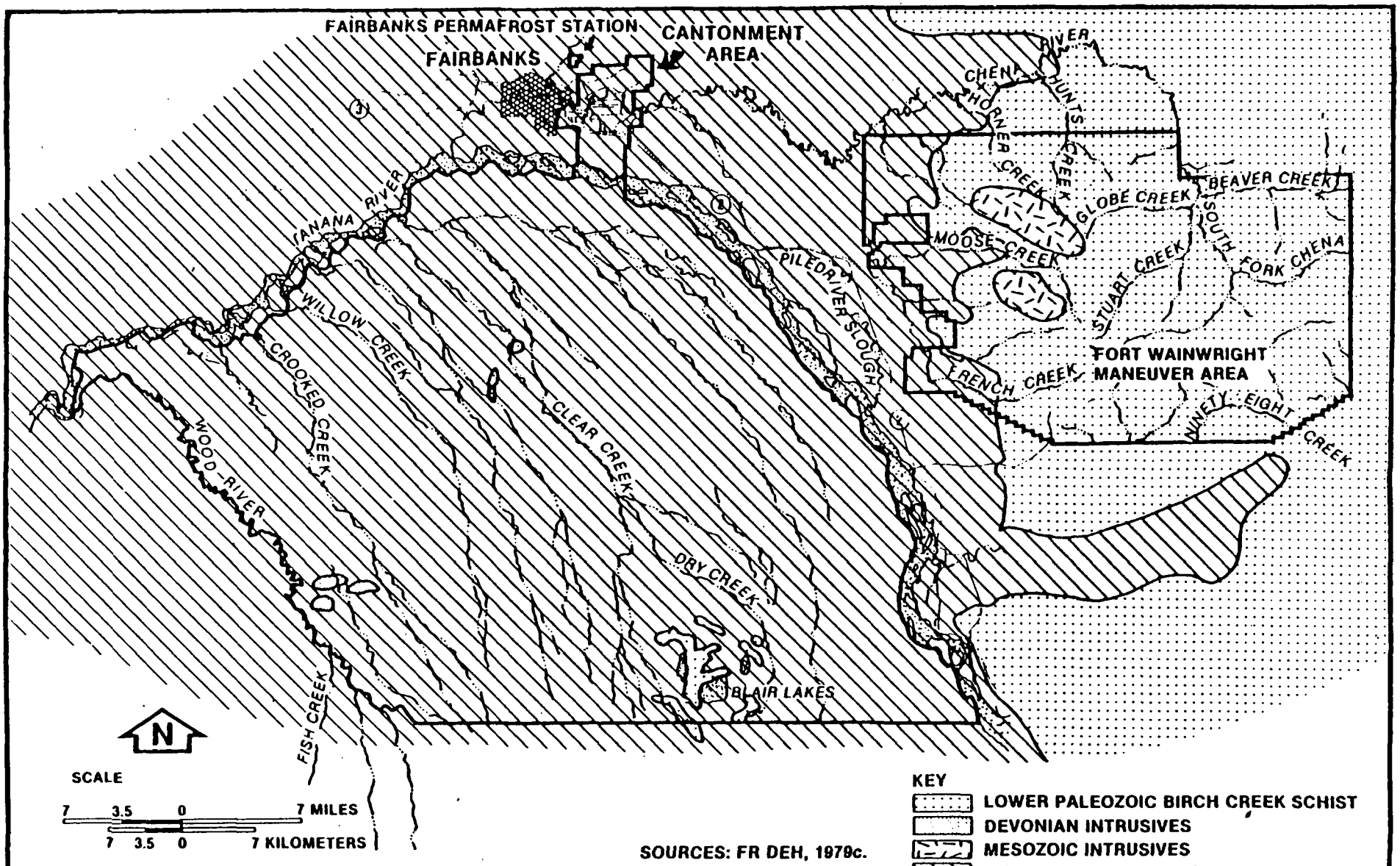
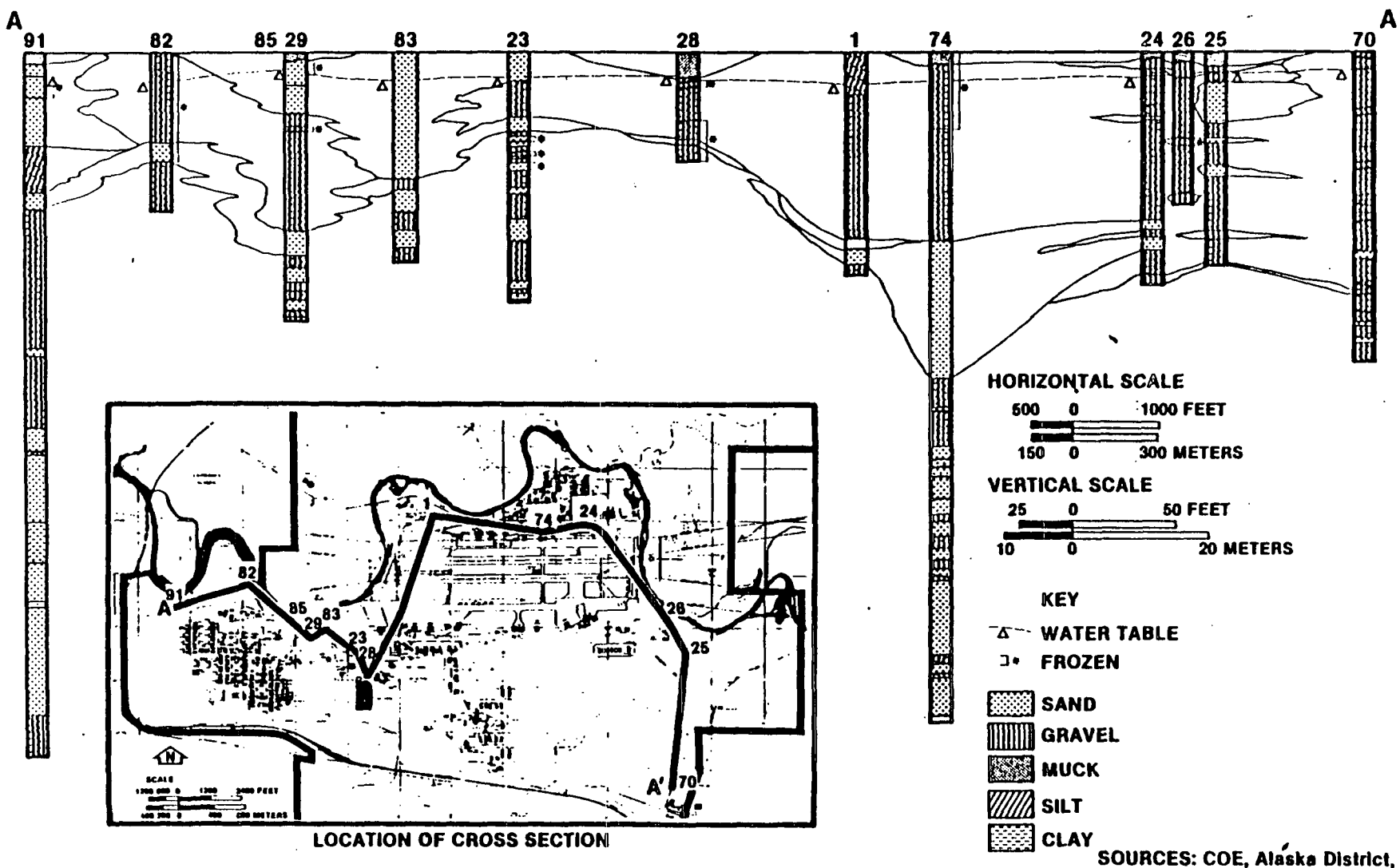


Figure 1.6-3
GEOLOGIC MAP OF FORT WAINWRIGHT

Prepared for:
U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland



SOURCES: COE, Alaska District, 1944.
ESE, 1982.

Figure 1.6-4
GEOLOGIC CROSS SECTION THROUGH THE FORT WAINWRIGHT CANTONMENT AREA

Prepared for:
U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland

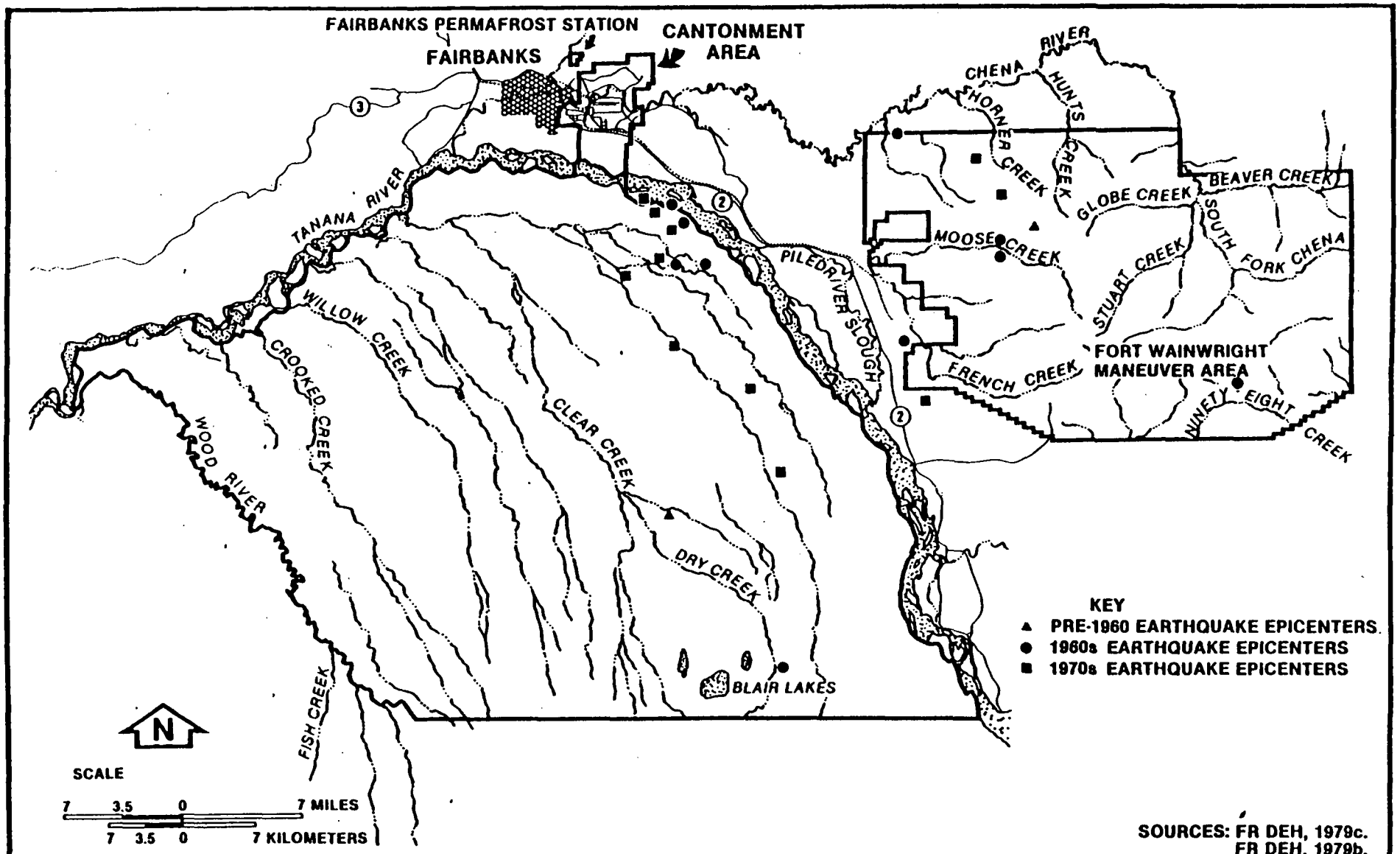


Figure 1.6-5
SEISMIC ACTIVITY ON FORT WAINWRIGHT

Prepared for:
U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland

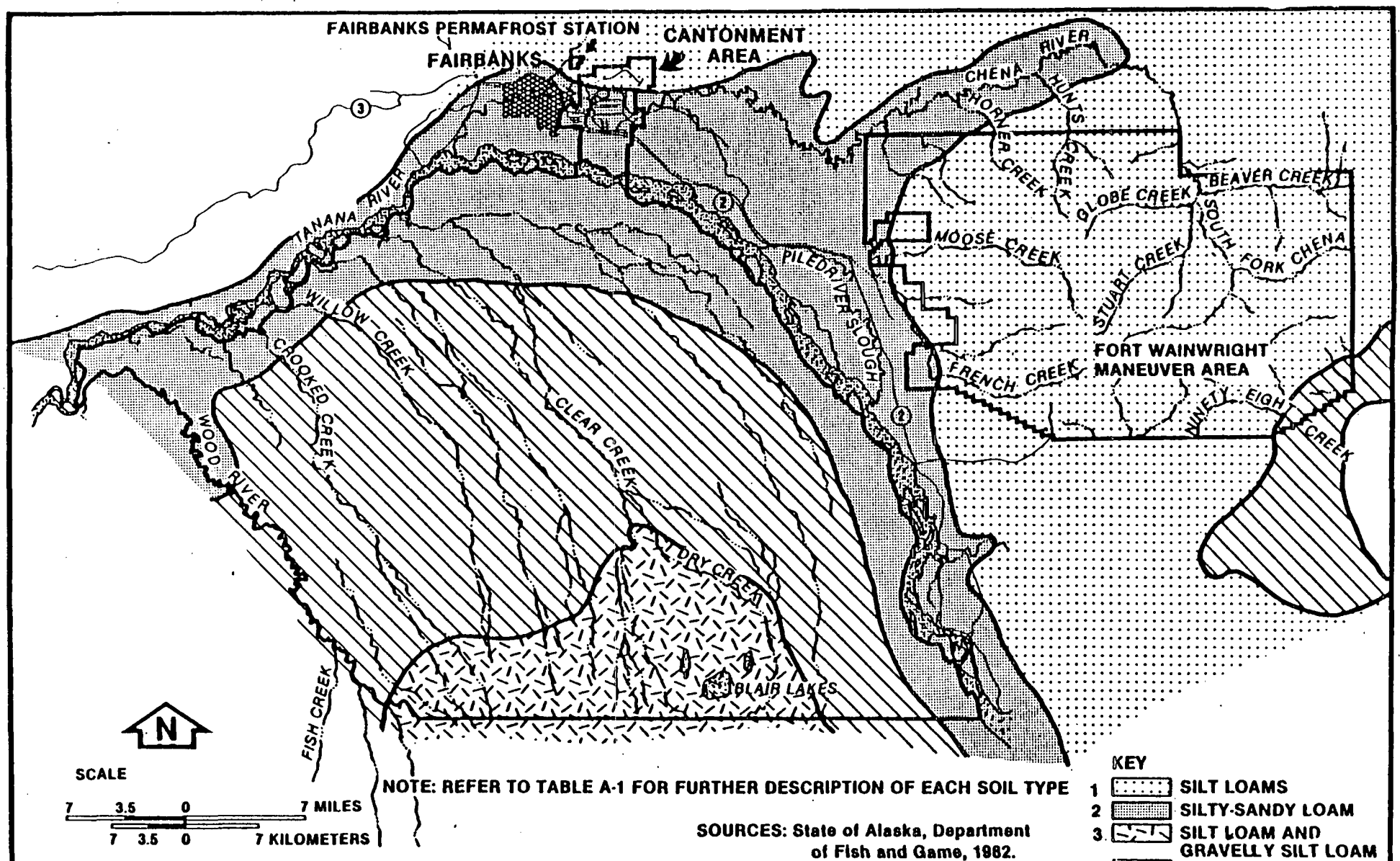


Figure 1.6-6
SOILS MAP OF FORT WAINWRIGHT

Prepared for:
U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland

bedrock. The area comprising the flood plain of the Tanana and Chena Rivers is occupied by silty sandy loams and is poorly drained. The area south of the Tanana River is occupied primarily by silt loam, while the north-facing slopes of hills around Blair Lakes and the southwestern corner of the installation are occupied by gravelly silt loam. The northwestern boundary of the installation near Goldstream Creek is occupied by stratified loam and sandy silty material.

Permafrost (a permanently frozen subsoil) with high ice content generally occurs on north-facing slopes (Peive and Bell, 1975a). Silt on lower slopes and valley bottoms is also perennially frozen. Ground ice is abundant as seams, sheets, and wedges. The thickness of this permafrost varies from 0.3 to 53.2 m.

Permafrost with moderate ice content occurs in alluvial fans overlying sand and gravel and in meander scars. This permafrost is discontinuous; it generally contains no ice seams but occurs in pore spaces. The thickness of this permafrost ranges from 0.6 to 47 m.

Low-ice-content permafrost comprises 80 percent of FW. This permafrost is discontinuous, with silts overlying sand and gravel. Seams of ice may also occur, and the sand and gravel may contain ground ice within the pore spaces. The permafrost in this area may be 0.3 to 84 m thick.

Ground Water

Ground water occurrence is determined by sediment type, extent of permafrost, and available source of recharge. Generally, the ground water supply is greatest along the flood plains of the major rivers and alluvial fan area of BLMA. Ground water yields in these areas are from 3,780 liters per minute (lpm) to 11,340 lpm (FR DEH, 1979b). Lower ground water yields (189 lpm) are found in predominately bedrock upland areas (Peive and Bell, 1975b). The aquifer is effectively confined where deposits of silt occur in permafrost.

Recharge to the aquifer occurs primarily from the alluvium along the Tanana and Chena Rivers and from surface and underground flow from nearby uplands and mountains (FR DEH, 1979b, 1979c). Fig. 1.6-7 depicts ground water flow direction.

Wells

FW contains 101 wells, of which 7 are reportedly currently in use and connected to the potable water supply system. Five other wells are operational but are not part of the potable water system, and the remaining 89 wells have been abandoned. Table 1.6-3 presents available well data, and Fig. 1.6-8 shows the locations of major wells in the cantonment area.

1.6.5 BIOTA

A wide range in topography, elevation, and drainage patterns results in a number of distinct vegetation associations and a diverse wildlife and fish composition. Installation habitats range from aquatic and wetland areas to upland tundra in the eastern areas, and include all major vegetative associations found in interior Alaska. Detailed discussions of ecosystems, complete with lists of aquatic and terrestrial species, are provided in the installation Environmental Impact Statements (EISs) concerning installation utilization (FR DEH, 1979b) and proposed land withdrawal (FR DEH, 1979c); a detailed vegetation map is included in the FW Terrain Analysis (State of Alaska, Department of Fish and Game, 1982).

Vegetation

Forests, consisting of mixed coniferous and deciduous species, compose approximately 25 percent of the western section of FW (range complex, cantonment area, and BLMA) and 91 percent of the eastern FWMA. White spruce and balsam poplar are the dominant tree species, along with paper birch, black spruce, and aspen. These forests contain a dense ground cover of shrubs, forbs, grasses, and mosses in areas containing an open to moderately closed canopy. Bottomland spruce-poplar forest occurs

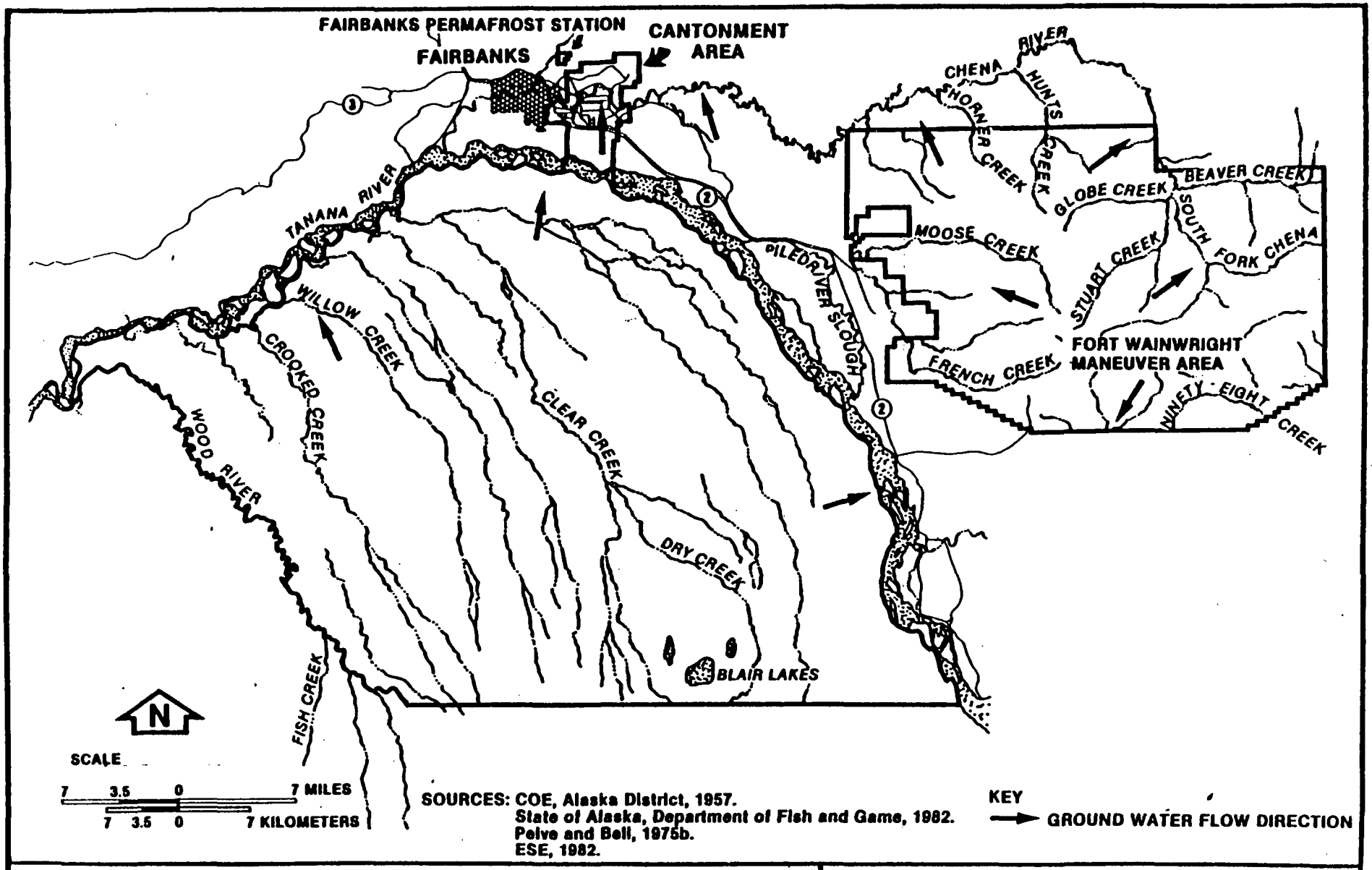


Figure 1.6-7
GROUND WATER FLOW DIRECTION ON FORT WAINWRIGHT

Prepared for:
U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland

Table 1.6-3. Well Data for FW

Location No.	Location Bldg.	In Use Yes	In Use Some	In Use No	Depth (m)	Diameter (cm)	Remarks
91	4026			X	98.8	15.24	
87	—			X	12.16	5.08	Glass Rd.
19	4227			X	54.11	10.16	
89	4200			X	—	5.08	
88	4038			X	12.16	5.08	
27	—			X	38.61	10.16	Between Glass Rd. and Tamarack Rd.
84	4206			X	39.52	10.16	
98	4023	X			—	30.48	
16	—			X	9.73	15.24	Applegate Rd.
17	4045			X	32.22	10.16	
20	4066			X	20.06	10.16	
92	4005			X	35.87	60.96	
93	4005			X	34.35	20.32	
82	4045			X	22.80	15.24	
18	4070			X	28.88	10.16	
85	4067			X	28.88	10.16	
29	4067			X	39.22	10.16	Ball Field
56	4067			X	27.97	10.16	
—	4067			X	—	—	No information
110	1187			X	79.04	15.24	
103	1166			X	—	—	
104	1168		X		—	20.32	
58	3652			X	50.77	10.16	
101	4074	X			14.59	30.48	
119	3605		X		—	15.24	
TW6	3115			X	—	—	Test well
8	3115			X	29.49	10.16	
39	—				30.10	10.16	Wind Rd.
41	—			X	29.49	10.16	Near Bldg. 3102
107	—			X	21.89	5.08	Near 10 St.
40	—			X	47.73	10.16	Near Whidden Rd.
37	3025			X	30.10	5.08	
38	3015			X	25.23	5.08	
7	—			X	20.06	5.08	Near Whidden Rd.
97	3650			X	—	15.24	
96	3596			X	—	15.24	
31	3598			X	25.23	5.08	
34	3588			X	20.37	5.08	
99	3594			X	—	30.48	
21	3592			X	35.87	10.16	
33	3020			X	19.15	10.16	
52	3022			X	24.93	10.16	
23	—			X	35.87	10.16	Meridian Rd.
15	—			X	9.12	5.08	Meridian and Gaffway Rds.

Table 1.6-3. Well Data for FW (Continued, Page 2 of 3)

Location No.	Location Bldg.	In Use Yes	In Use Some	In Use No	Depth (m)	Diameter (cm)	Remarks
12	—			X	10.94	10.16	Near Bldg. 1131
5	—			X	13.07	5.08	Near Bldg. 1131
79	—			X	14.89	10.16	Near Bldg. 1131
10	—			X	12.46	10.16	Near Bldg. 1131
22	3032			X	32.83	10.16	
81	3006			X	24.93	20.32	
48	3006			X	24.93	10.16	
71	3003	X			48.64	20.32	
83	—			X	30.10	20.32	Oak Ave.
100	3698	X			35.87	30.48	
108	—			X	—	—	Chippewa Ave.
63	1103			X	23.71	20.32	
53	1599			X	38.61	10.16	
28	1126			X	15.81	10.16	
36	—			X	34.66	10.16	Near Front St.
9	1599			X	51.68	10.16	
62	1598			X	54.72	10.16	
TW2	1598			X	—	—	Test well
3	1592			X	20.37	10.16	
14	1578			X	17.02	5.08	
6	1575			X	34.05	60.96	
2	1562			X	32.53	60.96	
1	1562			X	29.49	45.72	
50	1046			X	34.96	10.16	
57	1046			X	48.64	10.16	
69	1546			X	17.02	10.16	
4	1024			X	13.68	10.16	
102	1036			X	8.51	5.08	
86	1032	X			17.63	30.48	
95	1012	X			18.24	20.32	
94	1012			X	18.24	30.48	
68	1019			X	47.12	10.16	
74	1004			X	95.76	10.16	
90	1001			X	33.44	20.32	
TW9	—				—	—	Test well near Hangar 6
47	2079			X	25.54	10.16	
67	Hangar 7			X	22.8	20.32	
51	Hangar 7			X	20.37	10.16	
43	2109			X	23.10	10.16	
42	2077			X	18.85	10.16	
TW11	2063			X	—	—	Test well
TW12	2063			X	—	—	Test well

Table 1.6-3. Well Data for FW (Continued, Page 3 of 3)

Location		In Use			Depth	Diameter	
No.	Bldg.	Yes	Some	No	(m)	(cm)	Remarks
TW13	2063			X	—	—	Test well
75	2064			X	22.50	10.16	
86	5006			X	26.75	15.24	
70	5006			X	53.50	20.32	
106	5001		X		—	—	
101	—			X	30.70	12.7	Kinney and Montgomery Rds.
80	2092			X	—	10.16	
26	—			X	21.58	12.7	Kinney Rd.
24	2092			X	33.44	12.7	
109	2092		X		22.80	12.7	
30	2092			X	22.80	12.7	
65	2092			X	32.22	10.16	
49	—			X	14.29	10.16	Kinney and Tank Rds.
72	2060			X	24.02	10.16	
46	2062			X	17.02	10.16	
47	4073	X			51.07		

— = Not reported.

Source: FW DEH, n.d.

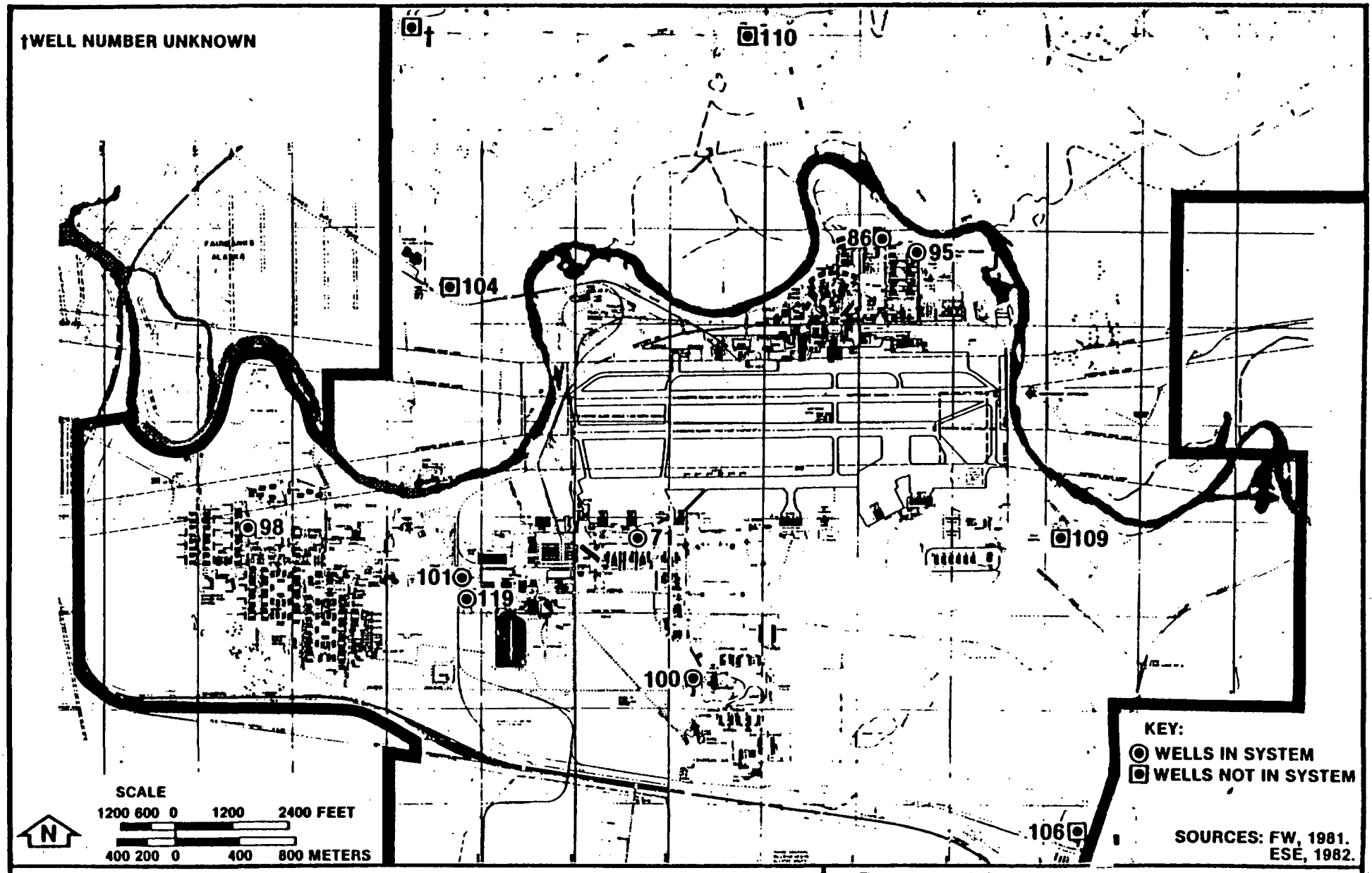


Figure 1.6-8
MAJOR WELL LOCATIONS ON THE FORT WAINWRIGHT CANTONMENT AREA

Prepared for:
U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland

primarily in lowland areas of the range complex and BLMA. Upland spruce-hardwood forest covers most upland areas of FWMA, and elevated areas in the Blair Lakes and Creek Butte areas of BLMA.

Shrub wetlands, which include bogs, muskeg, and deciduous scrub, comprise the dominant vegetation association on BLMA and cover 64 percent of the western sections of FW, including all central and northern areas of BLMA. Shrub wetlands, limited to the westernmost lowlands on FWMA, occur in inundated areas or areas with high water tables, which preclude most tree species. As a result, these areas are dominated by black spruce, willows, shrubs, and herbaceous wetland vegetation.

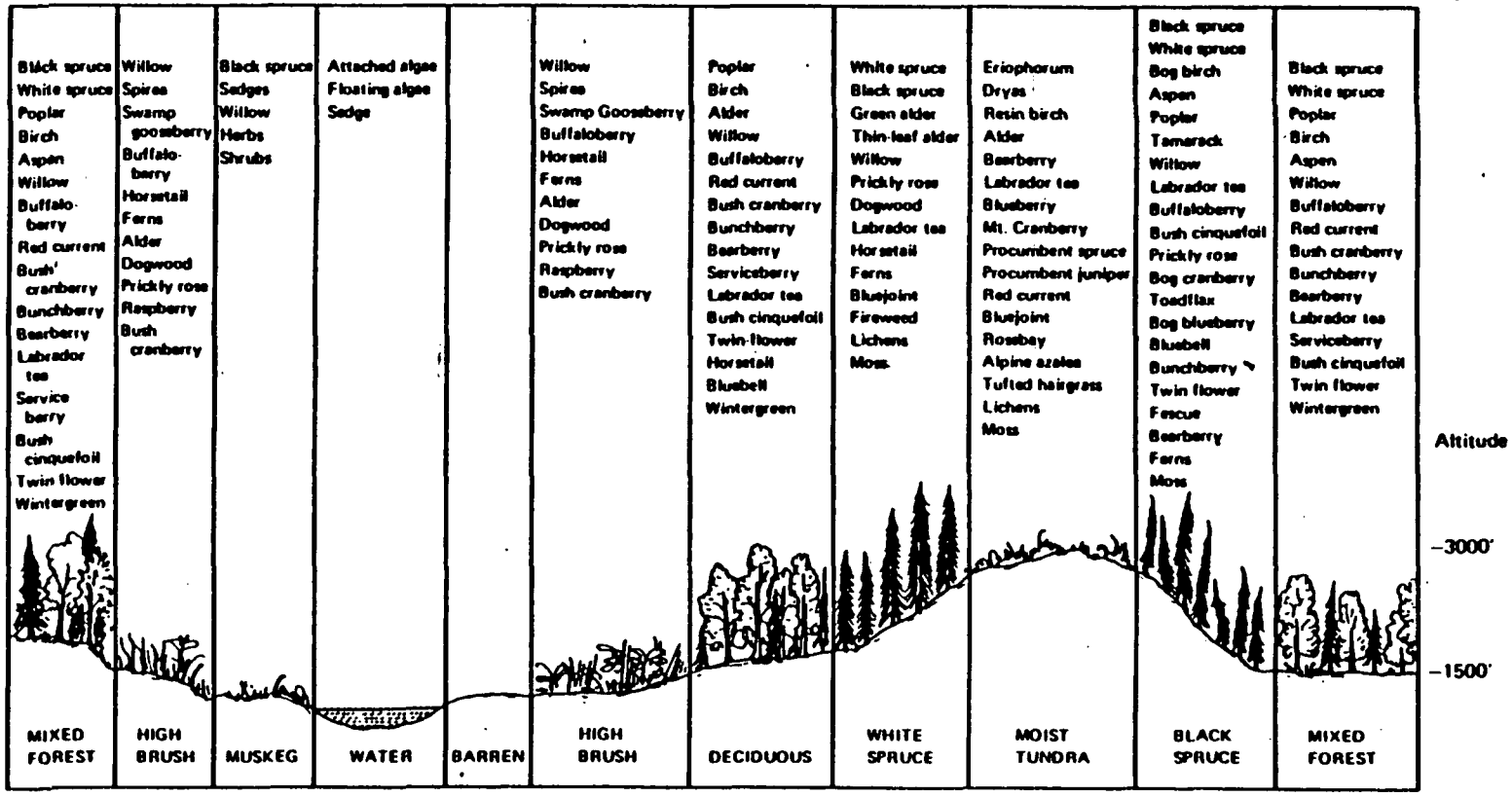
Tundra habitat covers approximately 1 percent of the western section and 2 percent of the eastern section of FW. Occurring at elevations higher than 750 m above sea level, tundra consists of low shrubs, lichens, grasses, and forbs. Tundra habitat occurs at high elevations throughout FWMA, but is limited to the Blair Lakes region on BLMA. Completely barren zones lacking a permanent vegetation cover are restricted to riverbeds, outwashes, and rock outcrops. Barren habitat does not constitute a major habitat type.

A profile of vegetation associations, along with a dominant species within each association, is shown in Fig. 1.6-9, and a listing of terrestrial vegetation appears in App. E of the FW EIS (FR DEH, 1979c).

Wildlife and Fish

The diversity and distribution of wildlife are related to the existing vegetation cover, traditional seasonal movements and habitats, and management practices. Due to the predominance of shrub wetlands and forests, most wildlife consists of species characteristic of these habitats.

Moose, the most abundant big game species, concentrate in the central and northern areas of BLMA throughout the year. BLMA contains the



SOURCES: FR DEH, 1979b.
ESE, 1982.

Figure 1.6-9
VEGETATION PROFILE OF FORT WAINWRIGHT

Prepared for:
U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland

largest known moose calving area in interior Alaska (FR DEH, 1979b) and, along with adjoining areas belonging to the State Game Unit 20, provides the largest state harvest of moose (FR DEH, 1979c).

Wolf, wolverine, and,black bear range over most forested areas, and grizzly bear and caribou are found in the far eastern portions of FWMA. Furbearer populations are significant and include marten, fox, and lynx, in addition to wolf and wolverine. Terrestrial mammals are listed in App. E of the FW EIS (FR DEH, 1979c).

In addition to furbearers and big game, game birds are abundant. Game species include rock and willow ptarmigan, spruce and sharptailed grouse, and a variety of ducks and geese. BLMA, in particular, is used by many species of waterfowl as nesting and staging areas from late April through freezeup. Birds are listed in App. E of the FW EIS (FR DEH, 1979c).

Most of the streams and rivers draining FW are clear and gravel bottomed and support a diverse biota. Year-round resident fish species include game and nongame species, while migratory species include King salmon, chum salmon, and silver salmon. The Salcha River, a tributary of the Tanana River located south of FWMA, contains the largest known spawning population of King and chum salmon in the Tanana drainage basin (FR DEH, 1979b). Fish species occurring are identified in App. E of the FW EIS (FR DEH, 1979c).

Threatened and Endangered Species

No species listed as threatened or endangered by the U.S. Fish and Wildlife Service (FWS) or the state of Alaska maintain resident populations at FW. Several species are protected by FWS in the lower 48 states, but not in the state of Alaska.

1.7 REAL ESTATE

FW consists of 371,239 ha of land withdrawn from the Public Domain. It has numerous outgrants for schools; power and oil pipeline rights-of-way; and to other Federal, state, and local agencies [U.S. Air Force (USAF), state of Alaska, city of Fairbanks, Bureau of Land Management (BLM)], which render 79,722 ha unavailable for the performance of Army activities (FR DEH, n.d.). A list of outgrants is presented in App. B.

USAF is the only agency currently holding an outgrant with FW which handles toxic and hazardous materials. USAF uses areas on both BLMA and FWMA for air-to-ground training with various types of weaponry as described in Sec. 2.1.5. USAF provides demolition services for these areas through the 343d Consolidated Aircraft Maintenance Squadron (CAMS).

No problems were noted with existing outgrants with respect to toxic and hazardous materials.

1.8 LEGAL CLAIMS

No legal claims exist with regard to the handling, disposal, or migration of toxic/hazardous materials.

2.0 PAST AND CURRENT ACTIVITY REVIEW

2.1 INSTALLATION OPERATIONS

2.1.1 INDUSTRIAL OPERATIONS

Industrial operations involve primarily aircraft and vehicle maintenance. Direct support/general support (DS/GS) equivalent levels of maintenance are conducted on helicopters, along with the aircraft attached to FR, by the 568th Transportation Company. DS/GS-level maintenance includes airframe, engine, and instrument repair. Three aviation units also conduct organizational-level aircraft maintenance on assigned aircraft, including inspection, lubrication, and some minor parts replacement.

Six units provide organizational-level maintenance for assigned vehicles. DIO provides DS-level maintenance for commercial vehicles, and the 172d Direct Support Detachment provides DS-level maintenance for heavy equipment. DS-level maintenance includes major parts changes, painting, and body work. GS-level support is given by FR, but some GS-level maintenance is conducted at FW with FR approval.

DIO also operates a general services shop, which contains an office furniture refurbishing shop and an equipment repair shop.

Current industrial operations are summarized in Table 2.1-1. Industrial operations conducted in 1969 are summarized in Table 2.1-2.

2.1.2 LESSEE INDUSTRIAL OPERATIONS

Laundry services are contracted out by DIO to Wilsyk Alaska, Inc. Perchloroethylene is used as the cleaning solvent at this facility. The drycleaning machines are equipped with diatomateous earth and activated

Table 2.1-1. Current Industrial Operations on FW

Organization	Bldg. No.	Activity	Potential Wastes
Motor Pools			
47th Engineer Company	3421	Vehicle Repair	Oils, Solvents
E Troop, 1st Air Cavalry	3725	Vehicle Repair	Oils, Solvents
1st Battalion, 37th Artillery	5195	Vehicle Repair	Oils, Solvents
4th Battalion, 9th Infantry	3425	Vehicle Repair	Oils, Solvents
222d Aviation Battalion	3485	Vehicle Repair	Oils, Solvents
242d Aviation Company	3485	Vehicle Repair	Oils, Solvents
283d Medical Detachment	3485	Vehicle Repair	Oils, Solvents
Transportation (DIO)	3487	Vehicle Repair	Oils, Solvents, Grease, Battery Acid
Aircraft Maintenance			
E Troop, 1st Air Cavalry	3008 (Hangar 2)	Aircraft Maintenance	Hydraulic Fluid, Oil, Grease, Solvents, Paints, Batteries
242d Aviation Company	2106 (Hangars 4-5)	Aircraft Maintenance	Hydraulic Fluid, Oil, Grease, Solvents, Paints, Batteries
222d Aviation Battalion	3005 (Hangar 3)	Aircraft Maintenance	Hydraulic Fluid, Oil, Grease, Solvents, Paints, Batteries
568th Transportation Company	2077 (Hangars 7-8)	Aircraft Maintenance	Hydraulic Fluid, Oil, Grease, Solvents, Paints, Batteries
Shops			
DEH Maintenance Shop	3015	Equipment Maintenance	Hydraulic Fluid, Oil, Solvents
Automobile Hobby Shop	1053	Automobile Repair	Oil, Solvents, Grease
172d Direct Support Detachment	1595	Heavy Equipment Maintenance	Paints, Solvents, Oil, Grease, Battery Acid
Installation Maitenance Facility	3479	Vehicle Repair	Oil, Solvents, Grease
General Equipment Maintenance Shop	3489	Painting, Fiberglass	Paint, Solvents, Plastic, Fiberglass
DEH Carpenter Shop	3022	Building Maintenance	Wood Waste
DEH Paint Shop	3022	Building Maintenance	Paints, Solvents
DEH Plumbing and Heating Shop	3018	Building Maintenance	Scrap Metal
Other Industrial Operations			
Laundry	3025	Washing, Drycleaning	Solvents
Power Plant	3595	Power Production	Ash

Source: ESE, 1982.

Table 2.1-2. Summary of Industrial Operations Conducted on FW in 1969

Organization	Bldg. No.	Activity	Potential Wastes
Motor Pools			
272d Signal Company	2106	Vehicle Maintenance	Oils, Solvents
559th Engineers Company	3008	Vehicle Maintenance	Oils, Solvents
171st Special Battalion	3015, 3008, 3676	Vehicle Maintenance	Oils, Solvents
6th Battalion, 9th Infantry	3675	Vehicle Maintenance	Oils, Solvents
2/15th Artillery	3834	Vehicle Maintenance	Oils, Solvents
40th Armor	3843	Vehicle Maintenance	Oils, Solvents
1st Battalion/47th Infantry	3844	Vehicle Maintenance	Oils, Solvents
TMP	3005	Vehicle Maintenance	Battery Electrolyte
472d MP Company	1543	Vehicle Maintenance, Parts Cleaning	Oils, Greases, Solvents
12th Aviation Company	1542	Vehicle Maintenance	Oils, Solvents
568th Transportation Company	3572	Vehicle Maintenance	Oils, Solvents
2/562 Artillery	3496	Vehicle Maintenance	Oils, Solvents
Shops			
Testing and Tuning Shop	1557	Engine Tuning	Oils, Solvents
Organizational Maintenance Shop	1053	Parts Cleaning	Oils, Solvents
Quartermaster Maintenance	3845	Spray Painting	Paints, Thinners
Automobile Shop	3102	Minor Automobile Repair	Oils, Solvents
Welding Shop	3006	Radiator Repair, Cleaning Metal Parts	Solvents
12th Aviation Company Maintenance	2085	Aircraft Maintenance	Oils, Solvents
Consolidated Maintenance Engineer Shop	1595	Vehicle Maintenance	Oils, Solvents
Vehicle and Armament Shop	1610	Vehicle Maintenance	Oils, Solvents
Post Paint Shop	1533	Spray Painting	Thinners, Paints
Special Services Arts and Crafts Shop	3009	Photography	Photo Solutions
Special Services Automobile Craft Shop	3115	Vehicle Maintenance, Cleaning Parts	Oils, Solvents
Sheet Metal Shop	2077	Aircraft Maintenance, Fiberglass Repair, Battery Rework	Oils, Hydraulics, Solvents, Styrene Monomers, Plastics Electrolytes
Engineer Services	1565	Vehicle Repair, Parts Cleaning	Oils, Solvents

Table 2.1-2. Summary of Industrial Operations on FW in 1969 (Continued, Page 2 of 2)

Organization	Bldg. No.	Activity	Potential Wastes
Other Industrial Operations			
Power Plant No. 2	1561	Power Production, Cleaning Metal Parts	Ash
Dark Room	1045	Photography	Photographic Solutions
*Post Drycleaners	3223	Washing Clothes, Spot Removing	Solvents

MP = Military police.

*Lessee operation, see Sec. 2.1.2.

Sources: Headquarters, Sixth U.S. Army Medical Laboratory, 1969.
ESE, 1982.

carbon filters and generate approximately 4.5 kilograms (kg) of waste filter material per day. Reportedly, the perchloroethylene is redistilled from this filter material prior to disposal. The waste filter material is placed in the post landfill.

2.1.3 LABORATORY OPERATIONS

Laboratory operations include the water analysis laboratory at the water treatment plant (WTP), the dental laboratory, and the hospital laboratories located at Bassett Army Hospital.

The WTP laboratory, located in Bldg. 3565, analyzes water for alkalinity, pH, fluoride, chlorine, iron, manganese, hardness, and stability index. Small quantities of liquid reagents are discharged to the sanitary sewer system, and solid wastes are disposed of in the sanitary landfill.

The veterinary laboratory uses approximately 7.6 liters per month (l/month) of Rocal D, a disinfectant, and smaller quantities of ethyl alcohol and formaldehyde. These wastes are discarded in the septic system which serves Bldg. 2063. Infectious wastes and animal carcasses are disposed of by incineration at a small onsite incinerator. Occasionally, this incinerator is also used to destroy classified documents and evidence (e.g., drugs) from the MP Detachment. Ash and residue from the incinerator are disposed of in the sanitary landfill. No photoprocessing is performed at the veterinary laboratory. No problems were noted with this operation.

The dental laboratory, located at Bassett Army Hospital, uses methanol and chloroform. The methanol is burned in alcohol lamps, and no wastes are generated. The chloroform, used in preparing dental molds, is evaporated, and no liquid wastes are generated. Solutions (approximately 191 l/month) used in the development of dental X-rays are sent to the hospital X-ray unit for combination and silver recovery before disposal. Scrap amalgams [approximately 1.4 kilograms/quarter (kg/quarter)], gold [approximately 12 grams per quarter (g/quarter)],

and silver (approximately 1.1 g/quarter) are transferred to hospital supply, which then transfers these items to DPDA for disposal. No problems were noted in this area.

Hospital laboratories, located in Bldg. 4065, include clinical chemistry, hematology, blood bank/serology, histology, and microbiology. Solvents used in these laboratory operations include methanol (1 l/month), formaldehyde (50 l/month of 10-percent solution), xylene (11 l/month), ethyl acetate (small quantity), toluene (small quantity), 95-percent ethyl alcohol (1.5 l/month), and 100-percent ethyl alcohol (5 l/month). All liquid waste solvents were formerly disposed of in the sanitary sewer system. Waste solvents are currently saved and taken to the fire department for inclusion in the solvents/waste oils used for firefighting training activities.

In addition to solvents, the hospital laboratories also use acids and bases which, as dilute solutions, are disposed of in the sanitary sewer system. No problems were noted in the operation and disposal procedures at the hospital laboratories.

The hospital also operates an X-ray laboratory. Silver is recovered from X-ray developing solutions and turned over to hospital supply. Exposed and scrap film are also turned over to hospital supply for disposal. No problems were noted with this operation.

Hospital supply serves as the focal point for the disposal of wastes (other than infectious) generated by hospital laboratory operations. Those items which have a salvage value (e.g., metals) are turned over to DPDA. The most recent records indicate the following items were turned over to DPDA during the first quarter of 1982 (Jan. 1 to Apr. 1).

Item	Quantity
Silver (metal)	11 g*
Silver (sludge)	4.99 kg
Amalgam	1.68 kg
Exposed film	23.59 kg†
Scrap film	29.03 kg
Electrodes	283 kg
Gold	12.5 g
Batteries	0.5 kg

* g = grams.
† Averages 1,200 kilograms per year (kg/year) (total of all film).

Infectious wastes generated at Bassett Army Hospital are incinerated, and the ash is disposed of in the sanitary landfill. No problems were noted with the disposal practices by hospital supply or Bassett Army Hospital.

CRREL is located at Bldg. 4070. Although the term "laboratory" is included as part of the organizational name, CRREL's mission is to: (1) assume responsibility for scientific and technical investigations of cold environments, and (2) conduct and coordinate research and surveillance for technological application of Army needs where cold weather is a factor. Solutions to problems resulting from cold weather conditions are developed in Hanover, N.H., and field tested by the CRREL unit at FW. The CRREL unit on FW includes a small laboratory for soil testing. Reportedly, no toxic or hazardous chemicals are used in this operation.

2.1.4 MATERIEL PROOF AND SURVEILLANCE TESTING

No materiel proof and surveillance testing is performed, and no test ranges are located on FW. A noncontiguous subordinate facility of FW is the Fairbanks Permafrost Station, consisting of 54 ha within the city of Fairbanks. This parcel is a research and storage area for the CRREL Alaska Projects Office, which is headquartered at FW.

2.1.5 TRAINING AREAS AND RANGES

Since 1961, the mission has been to command, train, and maintain assigned units at the required state of readiness, and to prepare and maintain specified mobilization, contingency, and operations plans. In the event of war, FW's primary mission would be the ground defense of interior Alaska.

FW is used primarily by elements of the 172d Infantry Brigade (Alaska) for infantry training and maneuver exercises. Support to infantry troops is provided by field artillery units, engineering units, and the 222d Aviation Battalion, among others. Training and maneuver exercises are supported by a number of training areas and facilities, ranges, and maneuver areas.

Two of FW's three major land areas are subdivided into training areas. Sixteen training areas, numbered 99 to 115, are located in the Close-In Training Area Complex surrounding FW Army Airfield (FWAAF). Due to the proximity of the housing areas, the Close-In Training Areas are used for a variety of nonfiring exercises involving relatively small units. The Close-In Range Complex is located south of Richardson Highway between the cantonment area and the Tanana River flood control levee south of Training Areas 101, 102, and 104.

Seven training areas, numbered 1 through 7, are located in FWMA, which is east of EAFB (Fig. 2.1-1). In contrast, the extensive BLMA is not subdivided into numbered training areas, and requested training areas are assigned each unit by a four grid-point reference system by Range Control. One additional, special training area onpost is the firefighting training pit, located in an open area south of FWAAF southeast of Montgomery Rd. and Luzon Ave. Individual training areas are not assigned to special elements, but are assigned by Range Control on a first-come, first-served basis.

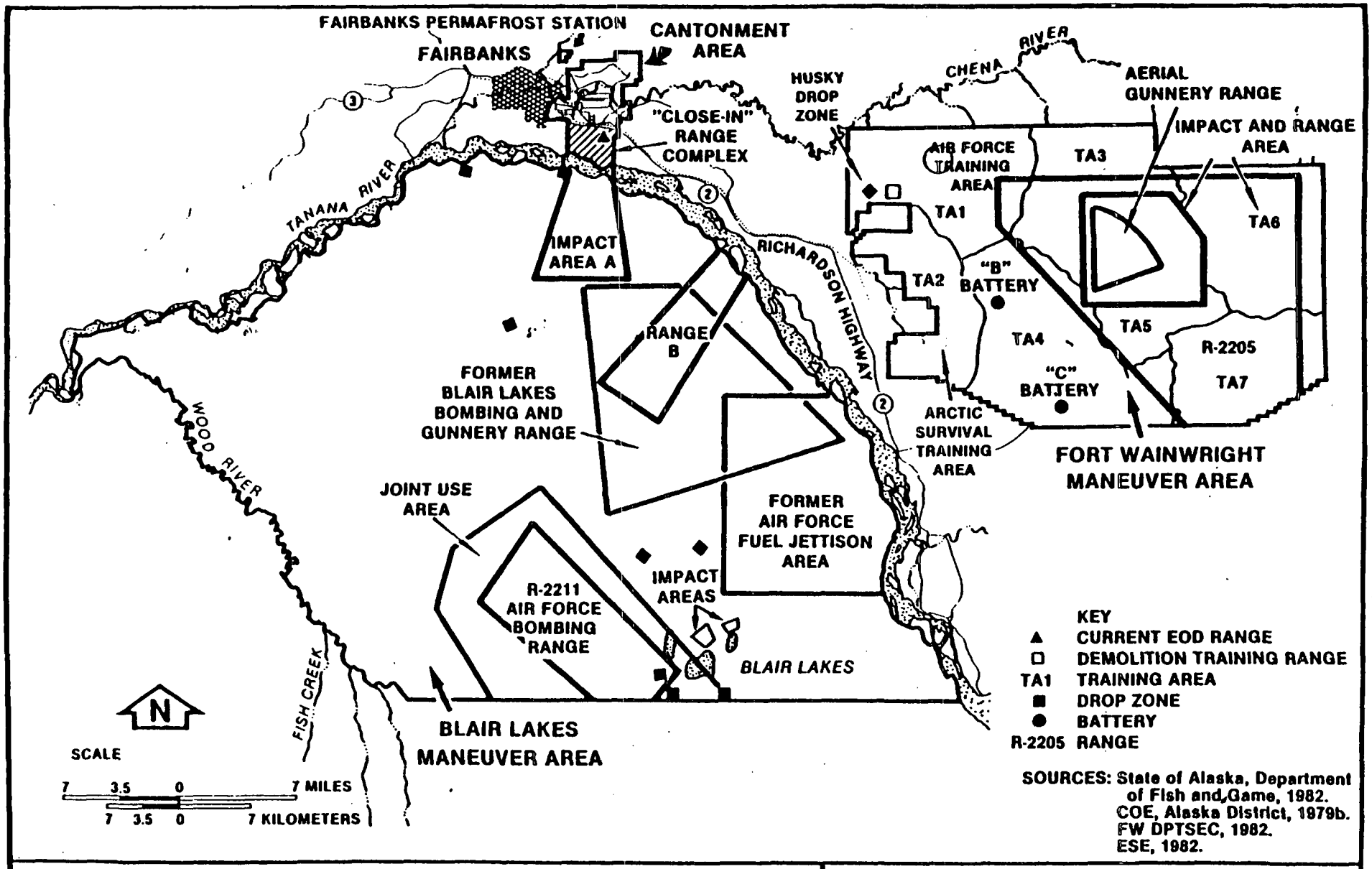


Figure 2.1-1
TRAINING AREAS AND RANGES ON FORT WAINWRIGHT

Prepared for:
U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland

The Close-In Range Complex, Range Control, and NBC facilities are located south of the Richardson Highway. Ranges in the Close-In Complex are listed in App. C. Firing fans for all ranges in this complex are oriented south and southwestward toward the Alpha Impact Area in BLMA.

BLMA is located south of the Close-In Range Complex and separated from the latter by the Tanana River, which forms BLMA's northwestern, northern, and eastern borders. BLMA contains several impact areas and bombing ranges in addition to nonfiring training sites.

BLMA is used for company and platoon-sized live-fire exercises, battalion bivouacs, airmobile operations, and ski and road marches in winter. Drop zones located in BLMA (Fig. 2.1-1) are used only in winter due to the predominance of muskeg bogs and other wetlands. The Blair Lakes Bombing and Gunnery Range, located in the south-central portion of BLMA, is a permanent outgrant to USAF.

Several impact areas are located within BLMA. The Alpha Impact Area, located south of the Close-In Range Complex and Tanana River, serves as an impact area for direct firing weapons and artillery fired at the Close-In Complex, V-Gulch firing point, and for aerial gunnery. Ordnance fired into the Alpha Impact Area include 7.62-millimeter (mm), 81-mm, and 4.2-in mortars; 105-mm artillery; 40-mm grenades, 90-mm recoilless rifles (RR); 3.5-in high explosive (HE) rockets; tube-launched, optically-tracked, wire command link (TOW) missiles; light antitank weapons (LAW) rockets; mines; and 2.75-in folding fin rockets. The Alpha Impact Area was established in 1941 as the Blair Lakes Bombing and Gunnery Range.

Bravo Range is an elongated firing fan/impact area located south of the Alpha Impact Area. This range is used for firing 81-mm mortar and 105-mm artillery, in addition to other indirect firing weapons. The Dyke Range, located between Richardson Highway and the Tanana River,

provided firing locations for indirect firing weapons into the impact area surrounding Bravo Range. Dyke Range, used for firing 105-mm, 155-mm, and 175-mm artillery, was closed in the early 1970s.

A joint-use area and USAF outgrant are located in the south-central portion of BLMA. The USAF outgrant, known as the R-2211 Blair Lakes Bombing Range, is used for attack aircraft training and proficiency testing in gunnery and bombing techniques. Based on records kept by the 343d CAMS, EAFB, munitions used in the R-2211 area include M-64 500-pound (lb) bombs, BDU-33 bombs, Mark-106 rounds, 20-mm target practice (TP), 30-mm TP, 2.75-in rockets [inert and white phosphorus (WP)], and Mark-24 and LUU-2 flares.

FWMA, located north and east of EAFB, is divided into seven training areas and is used primarily by elements of the 172d Infantry Brigade (Alaska) for maneuver and training exercises. Infantry field training ranges from weapons training to large-scale brigade-size annual exercises. Winter exercises consist primarily of ski and snowshoe training, troop maneuvers, and cold weather survival training; summer exercises consist primarily of tactical exercises, road marches, and bivouacing. FWMA is also used for large-scale, joint readiness exercises (Jack Frost and Brim Frost), which involve joint air and ground operations; unconventional warfare operations; infantry operations; and counter air, air interdiction, and close air support training. Approximately 15,000 troops, 100 aircraft, and 300 wheeled vehicles participated in the 1981 Brim Frost exercises.

FWMA has been used by the Army since 1957. Facilities include a train fire range on the western portion; a central restricted area (R-2205) containing an impact area for aerial gunnery, surface to air, direct, and indirect firing; a drop zone (Husky) in the northwestern portion; and USAF facilities. The latter includes a communication station, cold weather survival training area, rifle range, and an air-to-ground gunnery range in the R-2205 impact area.

No past records of ordnance fired by the Army at FWMA are available, except for the past year. Ordnance items used between July 1, 1981, and July 1, 1982, are listed in App. C.

Heavy unexploded ordnance (UXO) contamination and lack of range clearance have resulted in the closing of the Accuracy Pad and the 90-mm Range by Range Control personnel. Similarly, the 40-mm Range is only rarely used due to heavy UXO contamination.

Abandoned facilities at FWMA include two former Nike sites. Batteries "B" and "C" are located west and southwest of the HE impact area, respectively, and served as Nike surface-to-air missile batteries until their deactivation in 1971. These dismantled sites are used as operating and support areas for electronic warfare emitters, and range control and operator position, for the USAF facilities. All FWMA areas not exclusively assigned for special training are used for fire, maneuver, and bivouac sites.

2.1.6 TOXIC/HAZARDOUS MATERIALS (HANDLING AND STORAGE)

This section describes past and current handling and storage of pesticides, polychlorinated biphenyls (PCBs), chemicals, radiological materials, and chemical/biological (CB) agents.

Pesticides

Pesticides (insecticides, herbicides, fungicides, avicides, and rodenticides) have been and are currently being used to maintain grounds and structures and to prevent pest-related health problems. Pest control services include the following: (1) household, structural, health-related, and nuisance insect and rodent control problems; (2) weed control programs at various industrial sites, such as security fences, parking areas, and utility sites; and (3) programs involving turf areas (e.g., golf courses) and ornamental trees and shrubs.

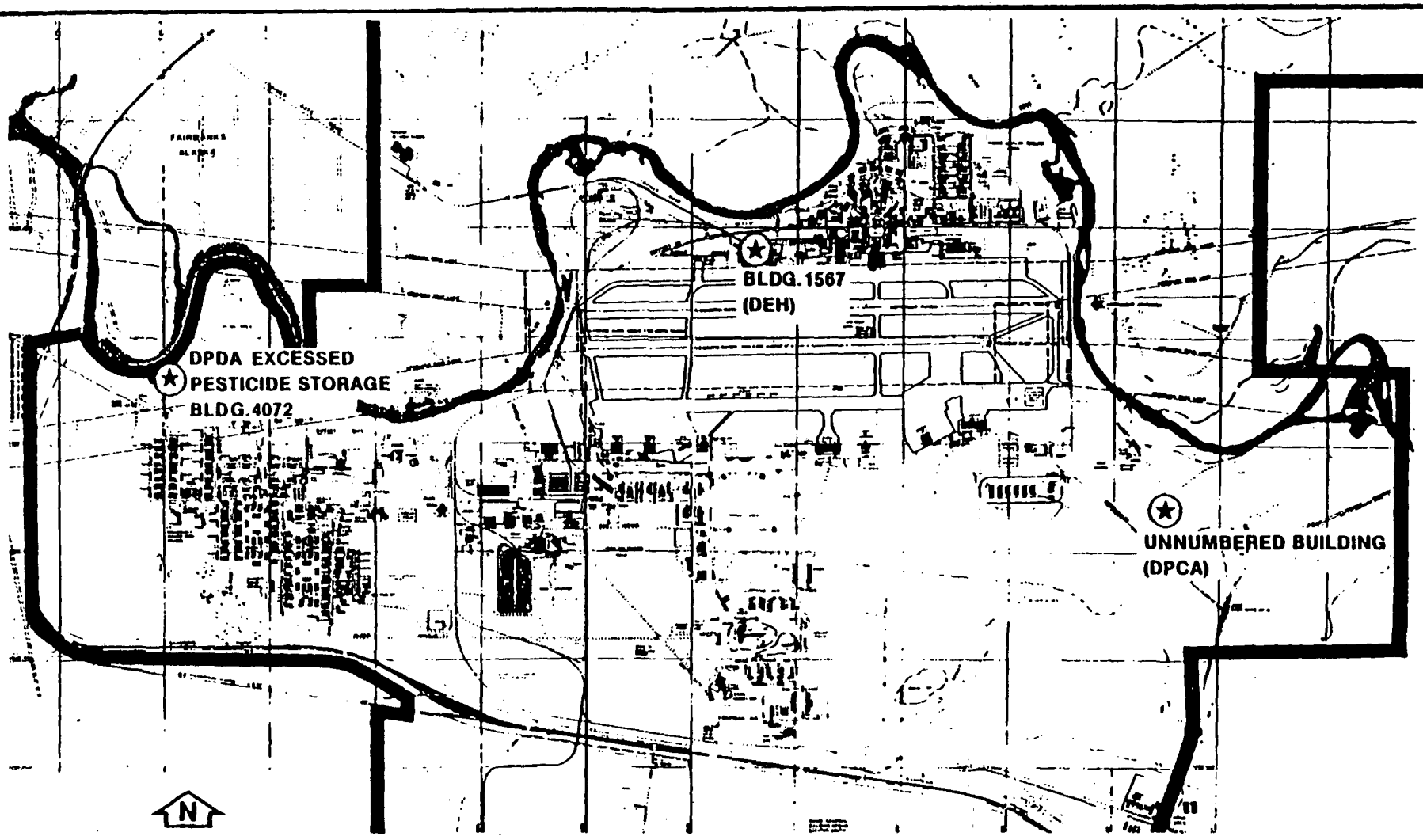
Pesticides are stored and used by the following subdirectorates: (1) DEH Entomology Branch (insecticdes, rodenticides, and avicides), and (2) DPCA Golf Course Activity (herbicides). Fig. 2.1-2 shows pesticide storage locations. The following paragraphs briefly describe the handling and storage of pesticides by these sections.

DEH Entomology Branch--Prior to 1973, pesticides were stored and mixed in what is currently Bldg. 1599 (formerly Bldg. 1606). Pesticide storage/mixing activities were moved to Bldg. 3015 in 1973 and remained there until 1979. During this period, large bulk quantities of pesticides were stored in the DEH warehouse (Bldg. 3019) and requisitioned on an as-needed basis. In 1979, all pesticides were moved into Bldg. 1567, where they are currently stored and mixed.

In early 1981, excess and "forbidden-use" pesticides were moved from Bldg. 1567 to Bldg. 4072 [formerly the south installation sewage treatment plant (STP)]. DPDA accepted accountability for these items in August 1981. Bldg. 4072 has a concrete floor, is secure, and warning signs are posted. A list of these excessed pesticides is provided in Table 2.1-3.

It was reported that only small pesticide spills [<3.8 liters (1)] had occurred onpost. These spills were cleaned up, and the rags/soils were disposed of in the landfill. Pesticide cans are triple rinsed, punctured, crushed, and disposed of in the landfill.

Although the current pesticide building does not meet all USAEHA guidelines, DEH has been working on upgrading the facility for the past few years. A Military Construction, Army (MCA) project to build a new storage/mixing facility was not funded in 1981 or 1982; however, some monies have been made available each year for minor improvements (e.g., curbing). The current facility is heated, fire resistant, curbed, and has impervious flooring without drains. At the time of the site visit,



SOURCES: State of Alaska, Department of Fish and Game, 1982.
ESE, 1982.

Figure 2.1-2
PESTICIDE LOCATIONS ON THE FORT WAINWRIGHT CANTONMENT AREA

Prepared for:
U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland

Table 2.1-3. Excessed Pesticides* on FW

Item	Quantity
Hyvar-X	17 x 50-lb BBL
Weedar	4 x 5-gal cans
Weedone	11 x 5-gal cans
2-4 D Ester	27 x 5-gal cans
Estron A4	2 x 55-gal drums
Apollo 445	1 x 20-gal drum
Malathion (95 percent)	1.5 x 55-gal drum
Baygon (1.5 percent)	38 x 1-gal can
Malathion (57 percent)	15 x 1-gal can
Warfarin Bait	41 x 5-lb can
Warfarin Bait	37 x 1-lb can
Baygon Bait	13 x 5-lb jar
Diazinon Dust (2 percent)	7 x 25-lb pail
Korlan 24E	11 x 1-gal can
Korlan 24E	2 x 5-gal can

gal = gallon.

* Currently stored in Bldg. 4072, under control of DPDA.

Source: FW DEH, 1982.

the facility did not meet USAEHA guidelines for ventilation, showers for personnel, or antibackflow valves on water taps. Reportedly, the base has installed these backflow devices since the site visit.

All personnel at the pesticide facility are certified pest controllers and receive blood tests on a routine basis. No problems have been reported.

Pesticides currently in stock in Bldg. 1567 are listed in Table 2.1-4. Pesticides currently are stored in secure lockers with appropriate warning signs. Bldg. 1567 also has the appropriate warning signs, emergency numbers, etc.

DPCA-Golf Course

Pesticides used at the golf course are currently stored in an unnumbered quonset hut southeast of Bldg. 2092. The personnel at the golf course are reportedly not certified to mix or dispense pesticides. This storage area has a wooden floor, is unmarked, unheated, and does not conform to USAEHA (1975) guidelines for the storage of pesticides.

PCBs

PCB-containing transformers were first installed at FW in the early 1940s. Some PCB transformers are still in use today. The electrical shop considers all in-service transformers to contain PCBs, unless they are new and known to be free from PCBs, and labels the transformers. App. D contains a listing of all transformers in service. All transformers are periodically checked for leaks and, if found, leaks are cleaned up in accordance with Federal PCB regulations (EPA, 1981e). When transformers are removed from service, they are analyzed for PCB content and turned over to DPDA for proper disposal. Transformers removed from service are sealed in plastic bags and placed in barrels before transfer to the DPDA storage area.

Table 2.1-4. Inventory* of Pesticides Currently on FW

Item	Quantity
Phyostoxin (Pellets)	122
Phyostoxin (Tablets)	180
Baygon (1.5 percent)	20 x 1-gal can
Pyrethrin Spray	125 x 12-oz can
Vapona Spray	102 x 12-oz can
Vapona Spray	76 x 6-oz can
Baygon Bait (2 percent)	3 x 5-lb jar
D-Sect	11 x 20-oz can
Dursban	4 x 1-gal can
Diazinon	69.5 x 1-gal can
Malathion	5 x 55-gal drum
Ammatex	25 x 60-lb bag

oz = ounces.

* Currently stored in Bldg. 1567.

Source: FW DEH, 1982.

The only reported spill occurred in Bldg. 3568. A pressure relief valve opened, releasing several tablespoons of PCB fluid. The fluid was cleaned up and transferred to DPDA for disposal. Pressure relief valves have since been fitted with plastic bottles to contain any fluids released.

DPDA has accomplished the past disposal of PCB transformers and fluids through contracts with Chem-Nuclear of Boise, Idaho, and American Electric Co. of Jacksonville, Fla. DPDA currently is seeking a contractor to remove additional PCB items. These items are stored at EAFB, not on FW. No problems were noted at FW with respect to PCB use, labelling, cleanup, or disposal procedures.

Chemicals

Small quantities of chemicals used in the hospital laboratories are enumerated in Sec. 2.1.3. Solvents are stored in special flammable storage cabinets, and acids and bases are segregated. No problems were noted with storage or disposal procedures.

BLM has a large storage area northeast of the runway where fire-retardant chemicals are stored. This storage area normally contains 100 to 250 tons of dry diammonium phosphate in bags and one 20,000-gal tank (water solution of diammonium phosphate) ready for immediate use in case of fire. Any spillage from this area flows into the storm drain system. No problems were noted at this storage area.

DPDA has two sheds for the storage of chemicals: one marked flammable, the other marked inflammable. Items stored in these sheds consist of bromochloromethane (nine 5-gal containers), pyrethrin (1 case), diazinon (two 5-gal containers), synthetic oil containing tricresyl phosphate, and paint (both lead based and nonlead based). These sheds do not meet EPA criteria (EPA, 1981a) for hazardous waste storage areas, since they do not have concrete floors; however, the quantities stored in these areas are small and would not migrate readily if spilled.

DPDA has another storage area for waste solvents, currently containing methanol (four 55-gal containers) and contaminated JP-4 (twenty-seven 55-gal containers). The area in which these items are stored is not bermed, as required by EPA and U.S. Army regulations (U.S. Army, 1978; EPA, 1981d).

DPDA formerly stored nineteen 55-gal drums and six aerosol cans of DDT. These items were removed in October 1981 and disposed of under a contract with Chemical Waste Management, Inc., of Emelle, Ala.

Agents

Reportedly, no lethal CB agents have been used at FW. Reportedly, several chemical agent detection kits were stored at FW until the late 1970s, when they were shipped to Rocky Mountain Arsenal. Riot control agent CS and camphor are currently used for training purposes at Bldgs. X40 and X41.

Radiological Materials

Storage and use of low-level radiological materials such as compasses, rifle and weapon sights, and source sticks for Radiac instruments are under U.S. Nuclear Regulatory Commission (NRC) licenses held by the U.S. Army Armament Materiel Readiness Command (ARRCOM), Rock Island, Ill., and the U.S. Army Communications and Electronics Command (CECOM), Fort Monmouth, N.J.

A Radiac calibrator, AN/UDM-2, is maintained at the Test Measurement and Diagnostic Equipment Branch to calibrate IM 174 series and AN/PDR 27 series Radiac instruments. Items requiring higher-level maintenance are shipped through the DIO Transportation Office to the Sacramento Army Depot. One AN/PDR 27 used for health physics survey is sent to EAFB for calibration.

DIO has a trained Radiation Protection Officer (RPO) assigned to supervise radiological safety matters. A recently compiled radiological

standing operating procedure (SOP) provides guidance for handling radioactive sources. An inventory of radioactive items located on the installation [required by the U.S. Army (1980) and the Department of Defense (DOD) (1981)] has not been accomplished. Approximately 1,200 LAW sights, each containing 3 millicuries (mCi) of promethium-147 (pure beta emitting), are consolidated in a secure area of the ammunition supply point (ASP) awaiting disposal.

Hazardous Waste Management

Since the site visit, FR has undertaken the development of a comprehensive hazardous material/waste storage and disposal program which includes FW. A hazardous waste management plan is being prepared, procedures are being developed, and a listing of equipment needed is being compiled so the installation is better prepared to comply with hazardous waste disposal regulations.

2.1.7 PETROLEUM, OILS, AND LUBRICANTS (POL) HANDLING AND STORAGE

FW's Spill Prevention Control and Countermeasure/Installation Spill Contingency Plan (SPCC/ISCP) was developed in March 1976 and is out of date. The SPCC/ISCP is being updated under contract by the Alaska District COE. The new plan is scheduled for completion prior to October 1983. Until this plan is updated, FW is not in compliance with state of Alaska regulations which require revision and updates every 3 years (State of Alaska, Department of Environmental Conservation, 1973).

Locations of POL storage areas are listed in App. E. Several of the aboveground tanks exceed 1,000 gal and are not bermed, presenting a potential spill problem. Pressure testing of underground tanks could not be confirmed during the site visit.

Firefighters receive training once each quarter. A training area has been established across Montgomery Rd. from Bldg. 2104. This area is equipped with a water storage tank and a waste fuel tank. The training pit is not lined, and the waste fuel tank and drum storage area are not bermed. Another firefighting training area was used in the past and was

located to the east of the current area, adjacent to the ammunition storage area. Former training pits and stained waste fuel storage areas were evident at the time of the site visit.

POL has been observed discharging into the Chena River. The source of the oil is unknown; however, it was thought to be from an abandoned oil line. Extensive digging in the area with a backhoe did not confirm the existence of an underground abandoned oil line. A catchment basin was constructed on the river bank to contain the oil. Currently, only a small quantity (produces sheen on water) is seeping from the bank of the river. The state of Alaska is aware of the oil discharge and is satisfied with FW actions to contain and remove the oil.

2.2 DISPOSAL OPERATIONS

2.2.1 INDUSTRIAL WASTES

Waste oils and solvents generated at FW are used in the power plant for the recovery of energy. Approximately 45,480 liters per year (lpy) are generated by FW. FG and FR also contribute waste oils and solvents to this recovery process. The primary cleaning solvent used was PD 680 Type II; halogenated solvents were not found to be in use at FW.

Battery wastes are handled by DIO in Bldg. 3477. The electrolyte is neutralized and discharged to the sewer system. Battery cases are sent to DPDA for disposal.

Vehicular painting involving spraying and brushing is performed on the unit level. Paint waste is placed in the landfill at an estimated volume of less than 189 lpy. Aircraft are painted by the 568th Transportation Company. Approximately 227 liters per quarter (l/quarter) are generated in this operation.

FW is classified as a generator and has filed an EPA Notification of Hazardous Waste Activity. A copy of this document is included in App. F.

2.2.2 WASTEWATER TREATMENT

Sanitary Wastewater Treatment

Sewage is discharged to the city of Fairbanks, where the waste has been treated for about 5 years. Before that time, the sewage was treated onpost in Imhoff tanks and was discharged to the Chena River. The wastewater flow is approximately 3.79 million liters per day (MLD).

Wash racks are connected to either the sanitary sewer or the stormwater drainage system. None of the wash racks are equipped with oil/water separators. Although the city of Fairbanks has not reported any problems related to treating the wastes, Army regulations require that all wash racks be equipped with oil/water separators (U.S. Army, 1978).

Holding Ponds

The only holding pond is a cooling pond for the power plant. This pond does receive the runoff from the coal storage area but does not discharge.

Stormwater Drainage

Stormwater is discharged by a system of ditches and culverts to the Chena River. No violation of water quality has been noted from this system.

National Pollutant Discharge Elimination System (NPDES) Permits

No NPDES permits are currently held by FW. One permit was held for the power plant cooling lagoon, but, when the cooling lagoon was modified to a closed system, the permit was no longer required. An NPDES permit was also held in the past for the discharge of the STP effluent into the Chena River. When FW discontinued the operation of the STP and discharged all sanitary sewage to the city of Fairbanks, the permit was allowed to lapse.

2.2.3 LANDFILLS/SOLID WASTE

Nine landfills and disposal areas (Table 2.2-1, Fig. 2.2-1) reportedly exist on FW, one of which (Location 1) is currently operating under

Table 2.2-1. Summary of FW Landfill Data

Landfill Location (see Fig. 2.2-1)	Location	Date Opened	Date Closed	Approximate Area (ha) or Volume (m^3)	Type of Refuse	Method of Operation	Problems Identified During Onsite Visit (see Sec. 2.2.3)
1	Ski and River Rds.	1950s	Ongoing	20 ha	Sanitary	Modified trench	Poor coverage, blowing asbestos, small arms, rare occurrence of explosions
2	Near Beacon Tower, off Kinney Rd.	Unknown	1967	1,063 m^3	Sanitary	Burned and area cover	None
3	On 100th St., near family garden plots	Unknown	Closed	20 m^3	Barrels	Surface and partial burial	No evidence of this disposal area could be found
4	Oak Ave.	Unknown	Closed	0.4 ha	Tar	Burial	None
5	Southgate Rd. and Alder Ave.	Unknown	Closed	0.4 ha	Tar	Burial	None
6	Southgate Rd. and Alder Ave.	Unknown	Closed	0.4 ha	Tar	Burial	None
7	Near Alder Ave. and Balsam St.	Unknown	Closed	0.4 ha	Tar	Burial	None
8	Trainer Rd.	Unknown	Closed	0.4 ha	Tar	Burial	None
9	Near Chena River, off Old Badger Rd.	Unknown	Closed	Unknown	Engine blocks	Area	None

m^3 = cubic meters.

Source: ESE, 1982.

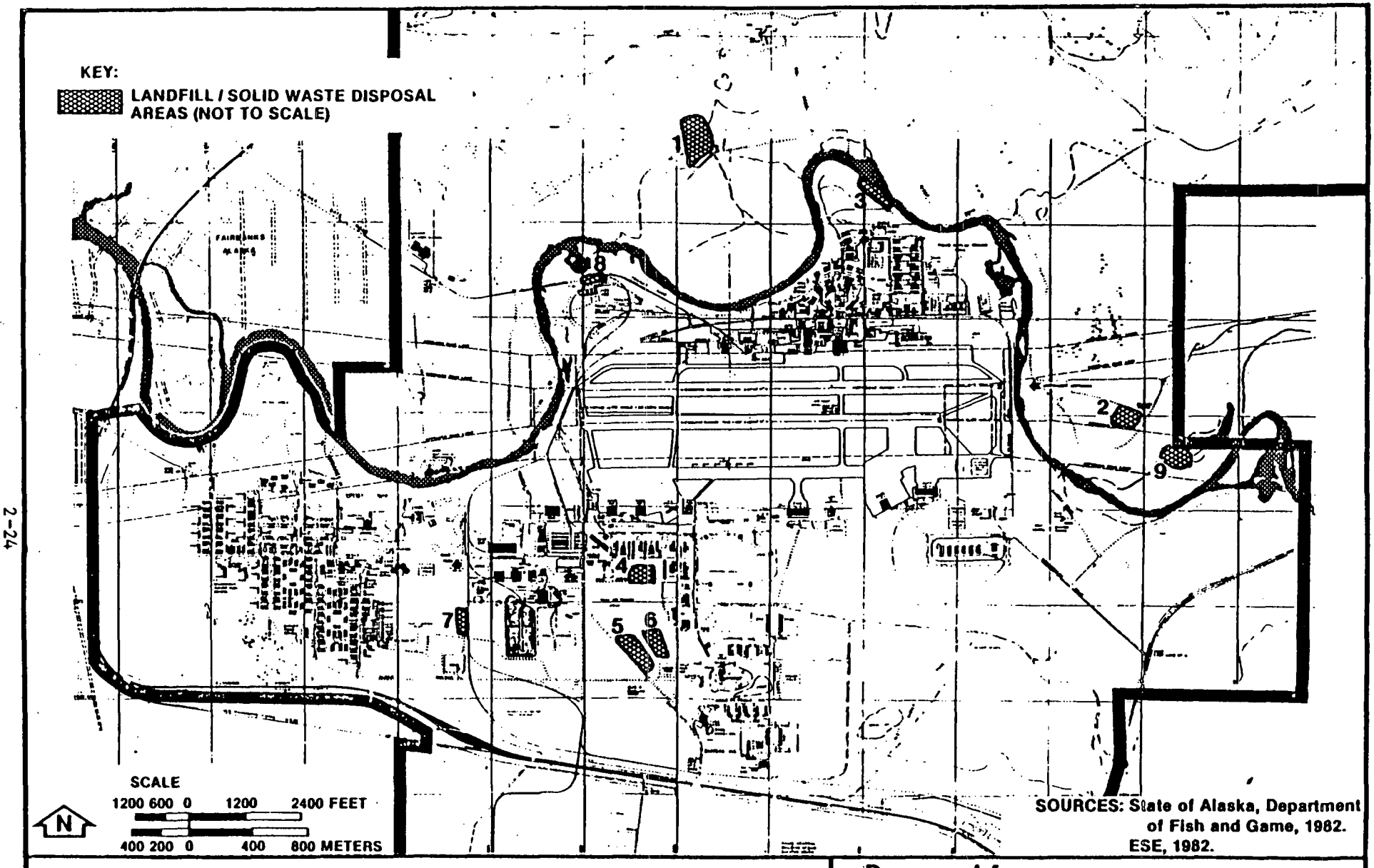


Figure 2.2-1
LOCATIONS OF LANDFILL/SOLID WASTE DISPOSAL AREAS ON THE FORT WAINWRIGHT CANTONMENT AREA

Prepared for:
U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland

Permit No. NR-10-79 (State of Alaska, Department of Environmental Conservation, 1980).

This landfill is sparingly emplaced every day. Final cover on the top of the landfill is good, but the finished slopes are not completely covered. Ash from the power plant is used as the cover material at the landfill. The ash has been tested for extraction procedure (EP) toxicity and determined not to be a hazardous material. Reportedly, this landfill is operating in accordance with state of Alaska regulations.

Asbestos is bagged and placed at a specified location in the landfill and then buried periodically. At the time of the site visit, some of the bags containing asbestos were open and subject to wind dispersal. Some rare occurrences of small arms and explosions in the landfill have been reported. The water table is at land surface in this landfill.

Landfill Location 2 was operated prior to 1967. Everything deposited within this landfill was burned prior to being covered.

Landfill Location 3 is reportedly the site of drum disposal. At the time of the site visit, no sign of barrels was evident.

Landfill Locations 4 through 8 are old tar disposal areas (pits). The tar and soils have been removed from these areas and used for road construction.

Landfill Location 9 contains some automobile engines.

2.2.4 DEMOLITION AND BURNING GROUND AREAS

FW does not have a permanent EOD detachment. Demolitions and destruction of explosive items are performed on an "on-call" basis by the 176th EOD Detachment, FG; on a quarterly basis and by request of the 176th EOD Detachment, FR; and by the USAF 343d CAMS, EAFB. CAMS

performs annual and monthly surface clearance of USAF target areas located in BLMA and in FWMA, but has also aided FW in the destruction of dud rounds produced during Army troop training on an irregular basis. Reportedly, an interservice agreement is expected to be signed in the near future between the 176th EOD Detachment and the 343d CAMS.

Unserviceable ammunition and duds are demolished at the Demolition Range, located in the southeastern corner of the Range Complex between the dike and Tanana River. This demolition range is assigned for exclusive use by the 176th EOD Detachment. The range contains craters for demolitions of up to 6.8 kg TNT or the equivalent. Following each shot, craters are visually inspected by EOD personnel, but no soil tests have been performed. Small arms munitions through .50 caliber (cal) are covered by dunnage and diesel fuel, then burned. Approximately 1,000 to 6,000 rounds of small arms munitions are burned quarterly. Larger items are blown up with C-4 or Flex-X explosives. No hopper burns of small arms munitions are conducted. Less than 45 kg of bulk powder are burned at the EOD range annually. However, 14 artillery firing points have small burn areas for destruction of excess of 105-mm powder bags. These firing points are located in the FWMA surrounding the R-2205 impact area. Annual amounts burned at these firing points are unknown, and no soil tests have been performed.

A former EOD range, closed in 1974, is located in the Alpha Impact Area of BLMA. No information is available regarding this EOD range. A demolition training range is located at Husky Drop Zone at FWMA.

2.2.5 DEMILITARIZATION

Demilitarization activities are limited to the demolition of unserviceable munitions, explosives, and duds by personnel from the 176th EOD Detachment, FR; the 176th EOD Detachment, FG; and the 343d CAMS, EAFB. Demolitions are primarily performed "in-place" at the Demolition Range or at the EAFB EOD Range.

2.3 WATER QUALITY

2.3.1 SURFACE

FW is drained by a number of streams, all of which flow ultimately into the Tanana River. A description of these water bodies is given in Sec. 1.6.3.

The state of Alaska has established water quality criteria for seven classes of water. A list of the classes, their intended use, and their associated criteria is presented in App. G. The standards recognize that many surface waters in Alaska have natural characteristics that may place them outside criteria applicable to manmade alterations of water quality.

The Chena River, from its confluence with Chena Slough to the confluence of the Chena River and the Tanana River, has been designated as Class C and Class D. All other streams in the FW area are considered to be in their original and natural condition and suitable to serve all uses established under each class (FR DEH, 1979c). In determining the appropriate water quality criterion where a stream has more than one classification, the more stringent water quality criterion applies.

Water quality data are available for Redmond Creek, Ninety-Eight Creek, and McCoy Creek and are presented in App. G.

Water temperature in the streams remains near the seasonal low of 0°C from October until April and rises to a high of 15° to 16°C in mid-summer. Unlike more temperate waters, streams in the FW area become anoxic in the winter as snow and ice cover limit photosynthetic activity and gaseous exchange with the atmosphere. Maximum dissolved oxygen (DO) levels occur during the spring and autumn and remain high throughout the summer. Levels for pH remain within acceptable limits throughout the year.

High iron concentrations have been noted in streams in the area. The elevated iron levels are thought to be caused by the reducing conditions prevalent in the swampy muskeg areas. Under reducing conditions, most of the iron is found in the more soluble ferrous form. Upon entering oxygenated streams, the ferrous iron is oxidized to ferric hydroxide, which precipitates and imparts a reddish color to the streams (see App. G).

Because the streams are not fed by glaciers, the suspended solid concentration is relatively low.

The data do not indicate surface migration of toxic substances.

2.3.2 SUBSURFACE

Subsurface water quality data for five wells located on FW are presented in App. G. In addition, USAEHA analyzed samples from 12 wells as part of a potable/recreational water quality survey in 1981 (USAEHA, 1981b). The USAEHA data are provided in App. G. Locations and physical characteristics of the wells are given in Sec. 1.6.4.

Ground water in Alaska is subject to water-use classifications A, B, F, and G (App. G). In general, ground water in the FW area is in compliance with National Interim Primary Drinking Water Regulations (NIPDWR) standards (EPA, 1981b) and National Secondary Drinking Water Regulations (NSDWR) standards (EPA, 1981c). The primary deviations from state and Federal standards are naturally high levels of iron and manganese. Neither iron nor manganese concentrations are medically significant. Concentrations in excess of the standards do, however, impair the utility of the water for aesthetic reasons. A well located at the POL tank farm was found to have elevated levels of trihalomethanes (THMs) in 1981. The well is a nonpotable source and is used only for sanitary service. The THM source has not been determined.

2.3.3 POTABLE

The well in Bldg. 4073 is the main source of water for the WTP and the main distribution system. The well in Bldg. 4074 is the main standby well and also discharges into the WTP. Five other standby wells discharge directly into the main distribution system, and are used only in emergencies.

Treatment of well water is accomplished by aeration, permanganate addition, polyelectrolyte addition, and filtration. Sand filters are backwashed every 24 hours. Chlorine is added in concentrations of 1.5 milligrams per liter (mg/l) of residual, but chlorine levels at end of pipe are maintained at 0.02 to 0.05 mg/l. Consumption at FW is approximately 4.5 MLD.

A USAEHA survey in 1981 (USAEHA, 1981b) found the treated water to be in compliance with NIPDWR and NSDWR standards with the exception of high iron and manganese concentrations.

2.4 AIR QUALITY

2.4.1 AMBIENT AIR QUALITY

FW is located in the Northern Alaska Intrastate Air Quality Control Region (AQCR). The combined effects of a restricted geographic basin, low winds, severe temperature inversions in the winter, and numerous sources of pollutants result in high concentrations of carbon monoxide and suspended particulates. As a result, the state implementation plan has classified carbon monoxide and suspended particulates as the highest priorities in this AQCR.

The state standards for sulfur dioxide, carbon monoxide, nitrogen dioxide, and photochemical oxidants are the same as the national primary ambient air quality standards (Table 2.4-1). State standards for sulfur oxides and for total suspended particulates (TSP) are the same as national secondary ambient air quality standards.

Table 2.4-1. Ambient Air Quality Standards

Pollutant and Type of Standard	Ambient Concentration Standards (ug/m^3) National Primary	National Secondary	Alaska
Sulfur Oxides			
Annual Arithmetic Mean	80	--	80
24-Hour Maximum*	365	--	365
3-Hour Maximum*	--	1,300	1,300
Particulate Matter			
Annual Geometric Mean	75	60	60
24-Hour Maximum*	260	150	150
Carbon Monoxide			
8-Hour Maximum*	10,000	10,000	10,000
1-Hour Maximum*	40,000	40,000	40,000
Nitrogen Dioxide			
Annual Arithmetic Mean	100	100	100
Photochemical Oxidants			
1-Hour Maximum*	160	160	160
Hydrocarbons			
3-Hour Maximum*	160	160	--

ug/m^3 = micrograms per cubic meter.
-- = No standard.

* Not to be exceeded more than once a year.

Source: FR DEH, 1979.

Table 2.4-2. Major Point Sources of Emissions* in the Northern Alaska Intrastate AQCR

Pollutant	Source	Estimated Emissions Before 1972 (tons/year)
Particulate Matter (TSP)	EAFB	424
	Fairbanks Airport	190
	Fairbanks Municipal Utility	900
	Fairbanks Municipal Utility	160
	FW Power Plant	366
	FW Power Plant	178
	FW Power Plant	1,670
	Golden Valley Electric	957
	University of Alaska	195
Sulfur Dioxide	EAFB	570
	Fairbanks Municipal Utility	235
	FW Power Plant	650
	Golden Valley Electric	392
	University of Alaska	190
Carbon Monoxide	EAFB	852
	EAFB	750
	Fairbanks Airport	709
	FG (Open Burning)	191
	FW Power Plant	168
	Golden Valley Electric	103
	NASA Station	106

NASA = National Aeronautics and Space Administration.

* >100 tons/year.

Source: FR DEH, 1979b.

While an ambient standard does not exist, ice fog is an air quality problem in the winter (FR DEH, 1979b).

2.4.2 SOURCE EMISSIONS

There are six coal-fired boilers, each rated at 230 million British thermal units per hour (MBTU/hr), located in Bldg. 3595 which supply heat and power to the post. Five diesel-fired standby generators are also located in Bldg. 3605, and four diesel-fired standby boilers are located in Bldg. 3505. As indicated in Table 2.4-2, the power plant is a major source of particulate matter, sulfur dioxide, and carbon monoxide. FW is in compliance with Alaska air pollution regulations (USAEHA, 1981a).

Other sources of air pollutants include exhaust emissions from vehicle maintenance shops and parking lots, fugitive emissions from storage piles and unvegetated areas, small space heaters in isolated buildings, and potential emissions from the laundry, drycleaning, and petroleum storage facilities.

2.4.3 PERMITS

Permit No. AQC-490 was issued by the Alaska Department of Environmental Conservation for the operation of the power and heating plant. The permit covers eight coal-fired boilers, four diesel-fired boilers, and seven diesel electric generators. The permit will expire on Jan. 30, 1983.

2.4.4 NOISE

The major sources of noise are ground vehicle operations, aircraft operations, construction activities, and artillery firing. None of the noise sources would be expected to produce an adverse community reaction other than sporadic complaints from onpost personnel concerning construction noise (FR DEH, 1979b).

2.5 IMPACTS ON BIOTA

Impacts on biological systems caused by installation activities include habitat alteration due to clearing of trails, roads, drop zones, ranges, and field airstrips; range wildfires resulting from firing exercises; and wildlife disturbance due to high noise levels at firing ranges, impact areas, and low-level helicopter operations.

Unimproved roads in FWMA have altered approximately 455 ha of terrestrial habitat, and adjacent firebreaks an additional 1,011 to 1,214 ha. In addition, improved dirt roads cover 538 ha of FWMA. Based on the availability of thousands of hectares of wildlife habitat on FW maneuver areas, loss of habitat due to roads and construction is not expected to adversely affect wildlife composition. Road access and construction on BLMA are limited.

Extensive tracts of land have been destroyed by wildfires started by firing exercises. Current mitigation and preventive measures include construction of firebreaks, cessation of live-firing during high fire hazard conditions, and availability of fire control equipment by the 172d Infantry Brigade (Alaska). The effects of past wildfires include improved browse conditions for moose, destruction of forest habitat, and erosion and siltation of aquatic systems. Fire-retardant chemicals (phosphates) air dropped by Army or BLM personnel also affect water quality by providing nutrients. A discussion of the FW fire history and resulting impacts is presented in the installation EIS (FR DEH, 1979c).

The degree of noise disturbance to wildlife varies with species sensitivity, habitation, noise levels, season, and frequency and duration of noise. Based on these variables and behavioral responses ranging from no visible response to habitat desertion, it is not possible to predict wildlife impacts resulting from military activities.

No adverse impacts on threatened or endangered species resulting from military activities have been reported.

3.0 INSTALLATION ASSESSMENT

3.1 FINDINGS

3.1.1 METEOROLOGY

Climatic conditions are characterized by great diurnal and annual temperature variations, low precipitation, low humidity, short moderate summers, long cold winters, great seasonal contrasts in light duration, and low incidence of cloud cover. Mean monthly temperatures range from -24.4°C in January to 15.9°C in July.

3.1.2 GEOLOGY

The installation is located on the flood plain alluvium of the Chena and Tanana Rivers. Bedrock occurs at approximately several hundred meters below land surface. The installation is covered by 3 m to 15 m of permeable soils.

3.1.3 HYDROLOGY

Recharge to the aquifer system occurs. Isolated areas of dense permafrost, which occur intermittently on the installation, act as confining beds. Areas where the permafrost is absent or less dense allow recharge. The ground water occurring above the permafrost is of poor quality and is not generally used. Water below the permafrost is of good quality and quantity and is the primary source of drinking water.

3.1.4 BIOTA

The cantonment area, range complex, and BLMA are located in the Tanana River flood plain. As a result, 94 percent of these areas consist of flat to gently rolling lowlands. Shrub wetlands, which include bogs, muskeg, and deciduous shrubs with hundreds of interspersed ponds, form the primary habitat in these areas; mixed coniferous-deciduous forest occurs in the cantonment area and range complex. In contrast, FWMA is

located in the Yukon-Tanana Uplands, and forest associations cover approximately 91 percent of the former; wetland habitats are restricted to low westernmost areas.

Moose is the most abundant big game species, and BLMA contains one of the largest moose calving areas. Numerous other game species, furbearers, and nongame species occur on BLMA and FWMA. No Federally or state-listed threatened or endangered species reside on FW.

Adverse impacts resulting from training activities are mitigated or eliminated by restricting firing of incendiary rounds during summer months to minimize wildfires; limited ground exercises at BLMA during summer; limited vegetation clearing at drop zones, ranges, and training areas as required; and protection of natural resources under the installation natural resources management plan. Based on a site survey in July 1982, no impacts or changes in vegetation structure were noted in the former BLMA fuel jettison area used by USAF prior to 1961. Since most onsite ponds freeze completely during the winter, fish occur primarily in the larger river systems, and no fish kills have been reported in the maneuver areas.

3.1.5 REAL ESTATE

FW currently has outgrants which total 79,722 ha. No problems were noted with these outgrants with respect to toxic and hazardous materials.

3.1.6 LEGAL CLAIMS

No legal claims exist with regard to the handling, disposal, or migration of toxic/hazardous materials.

3.1.7 INDUSTRIAL OPERATIONS

The primary industrial activities are vehicle and aircraft maintenance. Operations performed include engine tune-ups, engine overhauls, parts

cleaning and degreasing, painting, and battery rework. The primary wastes produced by the industrial operations are waste oils, hydraulic fluids, and solvents (nonchlorinated). These wastes are drummed and transported to the power plant, where they are burned to recover the heat value.

Other wastes produced by industrial activities include paints and battery electrolyte. Battery electrolyte is neutralized in Bldg. 3477 and discharged to the sanitary sewer system. Paint wastes are placed in the sanitary landfill. Only a small percentage of the approximately 1,000 lpy of paint waste contains lead. No problems were noted with the disposal of industrial wastes.

3.1.8 LABORATORY OPERATIONS

Laboratory operations include a WTP laboratory, veterinary laboratory, dental laboratory, clinical chemistry laboratory, hematology laboratory, histology laboratory, microbiology laboratory, serology laboratory, and X-ray laboratory. Dilute chemical wastes from these operations are disposed of in the sanitary sewer system (septic field for veterinary laboratory). Waste solvents are saved and turned over to the fire department for use in firefighter training activities. Silver is recovered from photographic solutions before disposal. No problems were noted with the laboratory operations.

3.1.9 TESTING

No materiel proof and surveillance testing is performed. CRREL conducts and coordinates research and surveillance for technological applications of Army needs where cold is a factor. These research activities are not confined to FW and include programs in Prudhoe Bay and the Fairbanks Permafrost Station (not contiguous to FW).

3.1.10 TRAINING AREAS AND ACTIVITIES

The north and south post areas are subdivided into training areas. Sixteen training areas in the Close-In area serve for nonfiring

exercises, while FWMA training areas are used for tactical, firing, and maneuver exercises. BLMA is not subdivided into training areas, and requested areas are assigned by a grid-point reference system.

The Close-In Range Complex, located south of the cantonment area and Richardson Highway, is the primary range complex. Additional ranges are located at FWMA and the northeastern portion of BLMA. Aerial gunnery ranges are located at the range complex, the R-2211 restricted area, and the R-2205 Blair Lakes Bombing Range. Firing from the range complex is oriented southward into the Alpha Impact Area located on the northernmost portion of BLMA. Firing along the Bravo Range (81 mm, 105 mm) is oriented southwestward into the former Blair Lakes Bombing and Gunnery Range Impact Area located on the eastern portion of BLMA. Ground-to-ground and air-to-ground firing at the R-2205 and R-2211 restricted areas is directed into central HE impact areas. Additional small impact areas are located in the Blair Lakes area of BLMA.

The Alpha Impact Area is not posted with warning signs, as required by Army Regulation 385-30, Chapter 2 (U.S. Army, 1971). FW issues fur trapping and hunting permits for BLMA, in which the Alpha Impact Area is located. The absence of warning signs in this area creates a potential safety hazard.

Weapons fired at range facilities currently range from pistol and rifle to 81-mm mortar and 105-mm artillery. Other ordnance fired in the past includes 155-mm and 175-mm artillery at the Dyke Range, 3.5-in HE rockets, 40-mm grenades, 66-mm LAW, 90-mm RR, M2A1 pop-up mines, and TOW missiles. Two former Nike sites have been dismantled.

Additional training facilities include several drop zones, the arctic survival training area, the air gunnery target complex containing surface-to-air missiles, anti-aircraft artillery, and airfield mock-ups at the R-2211 impact area and tactical maneuver areas.

Field exercises range from cold weather survival training to large-scale joint-readiness training exercises involving 15,000 troops, airborne operations, and close-air support.

3.1.11 TOXIC AND HAZARDOUS MATERIALS (HANDLING AND STORAGE)

Pesticides

The DEH pesticide facility, located in Bldg. 1567, meets USAEHA guidelines with respect to being curbed, having warning signs, and being operated by certified pesticide personnel. The pesticide facility does not meet USAEHA guidelines with respect to ventilation and antibackflow devices on water lines. Reportedly, antibackflow devices have been installed since the site visit. FW is upgrading the facility on a funds-available basis and has made progress in the past few years.

The DPCA pesticide storage area, an unnumbered building on the golf course, has wooden floors, does not offer protection from temperature extremes, does not have appropriate warning signs, and is not secure, as recommended by USAEHA guidelines.

PCBs

All transformers, unless known not to contain PCBs, are labeled and considered to contain PCBs. Upon removal from service, these items are tested and, if they contain PCBs, are securely packaged and shipped to DPDA for disposal. No problems were noted with PCBs handling or disposal procedures.

Chemicals

Chemicals are stored and used by laboratory activities. Excessed chemicals are stored by DPDA. No problems were noted with the storage or handling of chemicals.

Agents

Reportedly, no lethal CB agents have been used. Several chemical agent detection kits (approximately four) reportedly were stored at FW, prior

to their shipment to Rocky Mountain Arsenal in the late 1970s. Riot control agent CS has been and is currently used for training purposes.

Radiological Materials

Radiological materials are stored and used under NRC licenses held by ARRCOM, Rock Island, Ill., and CECOM, Fort Monmouth, N.J. FW has an RPO and has recently compiled a radiological SOP. An inventory of radiological items located on the installation has not been accomplished, as required under Army regulations [U.S. Army, 1980; Department of Defense (DOD), 1981].

3.1.12 POL HANDLING AND STORAGE

The FW SPCC/ISCP was developed in 1976 and is not in compliance with state of Alaska regulations (State of Alaska, 1973) which require the plan to be updated every 3 years. Since the site visit, the Alaska District COE has been contracted to update the plan, which is anticipated to be completed prior to October 1983.

Several aboveground POL storage tanks exceed 1,000 gal and are not bermed in accordance with Army regulations. Drum POL/solvent storage areas around the motor pools and at the power plant (Bldg. 3595) exceed 1,000 gal and are not bermed. The testing of underground storage tanks for leakage could not be confirmed during the site visit.

The unlined firefighting training pit, located east of the new ammunition storage area, contains oil which continually leaches into the ground. The drum storage area is also unbermed.

POL has been observed discharging into the Chena River. The source of the oil is unknown; however, it was thought to have migrated from an abandoned underground pipeline. Extensive digging in the area did not disclose the source of the oil. A catchment basin has been constructed along the river at the point of discharge to contain the oil.

Currently, only a small quantity is seeping into the catchment basin. The state of Alaska is aware of the oil discharge and is reportedly satisfied with FW actions to contain and cleanup the oil.

3.1.13 INDUSTRIAL WASTEWATER TREATMENT

No industrial wastewater is treated. Prior to 1977, all sanitary sewage and industrial wastewaters were treated on the installation by either the North Post or South Post STP. The effluent from both STPs was discharged to the Chena River under NPDES permit (AK-002195-4). Since 1977, all sanitary sewage and industrial wastewater have been treated by the city of Fairbanks, which does not have any problems with the treatment of these wastewaters.

Wash racks are not equipped with oil/water separators and discharge both to the sanitary sewer system and the stormwater drainage system. Army regulations require that wash racks be equipped with oil/water separators (U.S. Army, 1978).

3.1.14 CONTAMINATED WASTES

Contaminated and infectious wastes generated by the medical facilities are incinerated at Bassett Army Hospital. Residues and ash are removed and disposed of in the sanitary landfill.

Contaminated and infectious wastes generated by the veterinary facility are incinerated onsite. Residues from this incinerator are also disposed of in the sanitary landfill.

No problems were noted with the handling and disposal of contaminated and infectious wastes.

3.1.15 DEMOLITION AND BURNING GROUND AREAS

FW does not have a resident EOD detachment. Demolitions and destruction of explosive items are performed on an intermittent basis by personnel

from the 176th EOD Detachment (FG), the 176th EOD (FR), and the 343d CAMS (EAFB). The latter are primarily responsible for range clearance at USAF target and range areas.

Demolitions are performed at the Demolition Range located on the eastern portion of the range complex south of the flood control levee. Explosives are burned with diesel fuel or detonated with C-4 or Flex-X explosives. Less than an estimated 45 kg of powder are burned at the EOD range annually. In addition, limited quantities of excess 105-mm powder bags are burned at 14 artillery firing points. Annual amounts burned at these points are unknown, and no soil tests have been performed.

A former EOD area, closed in 1974, is located in the Alpha Impact Area. A demolitions practice range for small charges (up to 18 kg) is located at a field site at Husky Drop Zone.

Heavy UXO contamination and lack of range clearance have caused the closing of the Accuracy Pad and the 90-mm Range by Range Control personnel. Similarly, the 40-mm Range is only rarely used due to heavy UXO contamination.

3.1.16 WATER QUALITY

Surface

Water quality data available for several smaller streams indicate that the surface waters conform to Alaska water quality standards for their designated uses. There is no indication of surface migration of toxic substances.

Subsurface

Ground water generally conforms to NIPDWR (EPA, 1981b) and NSDWR (EPA, 1981c) standards. Iron and manganese concentrations are naturally high and adversely affect the aesthetic quality of the water.

Potable

Potable water is obtained from wells. The main well is located in Bldg. 4074. Raw water is treated by aeration, permanganate addition, polyelectrolyte addition, filtration, and chlorination. A survey by USAEHA (1981b) found the water to be in compliance with NIPDWR and NSDWR.

3.1.17 AIR QUALITY AND NOISE

A restricted geographic basin, low winds, severe temperature inversions in the winter, and numerous sources of pollutants combine to produce high levels of carbon monoxide and particulate matter in the FW area. The heat and power plant is a major source of particulate matter, sulfur dioxide, and carbon monoxide. A permit has been issued by Alaska for the operation of the power plant, and it is in compliance with regulations. Primary noise sources are vehicle operations, construction activities, and artillery firing.

3.1.18 LANDFILLS/DISPOSAL AREAS

One landfill is currently operating under state permit, while eight other landfills or disposal areas are closed.

At the time of the site visit, the daily cover was not adequate, though the final top cover was sufficient and showed no sign of decomposition. The final cover on the perimeter, however, was inadequate, and waste materials could be easily identified. Asbestos was bagged, but the bags were open. Small arms and explosions have been reported as rare occurrences in the landfill.

The landfill was constructed in a low area; the water table was at the land surface, creating potential for leachate formation and degradation of the aquifer. The state is satisfied with the operation of this landfill.

3.2 CONCLUSIONS

1. Available geologic evidence and information on contaminant sources do not indicate the offpost migration of contaminants via surface or subsurface waters.

2. The following practices for handling materials or waste disposal practices, while not leading to offpost migration, are not in compliance/conformance with designated guidelines/ regulations.
   a. The explosive ordnance disposal area has not been included in the hazardous waste permit application, nor have soils from the area been tested for hazardous residue, as required by EPA regulations (EPA, 1981a);
   b. Petroleum, oils, and lubricants/solvents are improperly stored (U.S. Army, 1978; EPA, 1981d);
   c. Wash racks, both inside and outside, do not have oil-water separators, as required by Army regulations (U.S. Army, 1978);
   d. Underground storage tanks are not leak tested, as required by Army and EPA regulations (U.S. Army, 1978; EPA, 1981d);
   e. Pesticide storage and mixing areas do not conform to U.S. Army Environmental Hygiene Agency guidelines (USAEHA, 1975);
   f. A radiological inventory has not been completed, as required by Army regulations (U.S. Army, 1980; DOD, 1981); and
   g. Alpha impact area is not posted with warning signs, as required by Army regulations (U.S. Army, 1971).
   h. The current Spill Prevention Control and Countermeasure/ Installation Spill Contingency Plan, prepared in 1976, has not been updated in accordance with state of Alaska regulations (State of Alaska, 1973).

3.3 RECOMMENDATIONS (KEYED TO CONCLUSIONS)

That USATHAMA should:

1. Not conduct a survey at this time.

That FW should:

2. a. Bring explosive ordnance disposal areas into compliance with EPA regulations;
   b. Properly store petroleum, oils, and lubricants/solvents;
   c. Bring wash racks into compliance with Army regulations;
   d. Test underground petroleum, oils, and lubricants storage tanks for leakage on a periodic basis;
   e. Continue with the program to upgrade the pesticide storage/mixing area located at Bldg. 1567 and bring the pesticide mixing/storage area located at the golf course into conformance with U.S. Army Environmental Hygiene Agency guidelines;
   f. Conduct a radiological survey; and
   g. Post the Alpha impact area, as required by Army regulations.
   h. Continue efforts to update the Spill Prevention Control and Countermeasure/Installation Spill Contingency Plan.*

* Since the site visit, the Alaska District COE has been contracted to update the SPCC/ISCP. Completion is anticipated prior to October 1983.

BIBLIOGRAPHY

Headquarters, 172d Infantry Brigade (Alaska). Fort Richardson (FR). 1976. Army Information: The U.S. Army in Alaska. APO Seattle, Wash. 172d Brigade Pamphlet No. 360-5. (RICH-216).

Headquarters, 172d Infantry Brigade (Alaska). Fort Richardson (FR). 1977. Training: 172d Infantry Brigade (Alaska) Range Regulations. APO Seattle, Wash. 172d Brigade Regulation No. 350-2. (RICH-198).

Headquarters, 172d Infantry Brigade (Alaska). Fort Richardson (FR). 1982. Organizations and Functions: Organizations and Functions of 172d Infantry Brigade (Alaska). Fort Richardson, Alaska. 172d Brigade Regulation No. 10-1. (RICH-52).

Headquarters, 172d Infantry Brigade (Alaska). Fort Richardson (FR). Directorate of Engineering and Housing (DEH). [n.d.] Outline of Briefing: Land Areas and Encroachments, 172d Infantry Brigade (Alaska) (Forts Richardson, Wainwright, and Greely). Fort Richardson, Alaska, 172d Infantry Brigade, Alaska. Fort Richardson, Alaska. (RICH-266).

Headquarters, 172d Infantry Brigade (Alaska). Fort Richardson (FR). Directorate of Engineering and Housing (DEH). 1979a. Draft Environmental Impact Statement for Installation Utilization at Fort Richardson, Alaska, 172d Infantry Brigade, Alaska. Fort Richardson, Alaska. (RICH-46).

Headquarters, 172d Infantry Brigade (Alaska). Fort Richardson (FR). Directorate of Engineering and Housing (DEH). 1979b. Draft Environmental Impact Statement for Installation Utilization at Fort Wainwright, Alaska, 172d Infantry Brigade, Alaska. Fort Richardson, Alaska. (RICH-51).

Headquarters, 172d Infantry Brigade (Alaska). Fort Richardson (FR). Directorate of Engineering and Housing (DEH). 1979c. Draft Environmental Impact Statement, Land Withdrawal, 172d Infantry Brigade (Alaska) at Fort Wainwright, Alaska. Fort Richardson, Alaska. (RICH-50).

Headquarters, 172d Infantry Brigade (Alaska). Fort Wainwright (FW). 1981. Fort Wainwright Building Map. Fort Wainwright, Alaska. (RICH-138).

Headquarters, 172d Infantry Brigade (Alaska). Fort Wainwright (FW). Directorate of Engineering and Housing (DEH). [n.d.] Well Location Map Fort Wainwright. Drawing No. 6808-4609. Fort Wainwright, Alaska.

Headquarters, 172d Infantry Brigade (Alaska), Fort Wainwright (FW). Directorate of Engineering and Housing (DEH). 1982. Pesticide Inventory as of 27 July 1982. Fort Wainwright, Alaska. (RICH-280).

Headquarters, 172d Infantry Brigade (Alaska), Fort Wainwright. Directorate of Plans, Training, and Security (DPTSEC). 1982. [Selected Ranges and Impact Areas on Fort Wainwright]. Fort Wainwright, Alaska. (RICH-270).

Headquarters, Sixth U.S. Army Medical Laboratory. 1969. Environmental Health Engineering Survey, Industrial Hygiene, Fort Wainwright, Alaska. Fort Baker, Calif. (RICH-141).

Miller, R.D. and Dobrovolny, E. 1959. Surficial Geology of Anchorage and Vicinity, Alaska. U.S. Geological Survey, Bulletin 1093, pp. 84-86. (RICH-278).

Peive, T.L. and Bell, J.W. 1975a. Map Showing Distribution of Permafrost in the Fairbanks D-2 SE Quadrangle, Alaska. U.S. Geological Survey, Miscellaneous Field Studies, Map MF-669A. (RICH-228).

Peive, T.L. and Bell, J.W. 1975b. Map Showing Ground Water Conditions in the Fairbanks D-2 SE Quadrangle, Alaska. U.S. Geological Survey, Miscellaneous Field Studies, Map MF-669B (RICH-229).

Peive, T.L. 1954. Effect of Permafrost on Cultivated Fields, Fairbanks Area, Alaska. U.S. Geological Survey Bulletin 989-F, pp. 322-323. (RICH-267).

State of Alaska. Department of Environmental Conservation. 1973. Alaska Oil and Hazardous Substances Pollution Regulations. Juneau, Alaska. In: Environment Reporter, State Water Laws, 706:0621-0629. (RICH-37).

State of Alaska. Department of Environmental Conservation. 1980. Waste Disposal Permit (Solid Waste Management Permit) No. NR-10-79, Issued to Fort Richardson for the Operation and Maintenance of the Fort Wainwright Landfill. Juneau, Alaska. (RICH-268).

State of Alaska. Department of Fish and Game. 1982. Endangered Species in Alaska. Juneau, Alaska. (RICH-5).

U.S. Army. 1971. Safety, Color Code Markings and Signs. Army Regulation No. 385-30, Chapter 2. Washington, D.C.

U.S. Army. 1978. Environmental Quality: Environmental Protection and Enhancement. Washington, D.C. Army Regulation No. 200-1 and Supplement 1.

U.S. Army. 1980. Safety: Ionizing Radiation Protection (Licensing, Control, Transportation, Disposal, and Radiation Safety). Washington, D.C. Army Regulation No. 385-11.

U.S. Army Corps of Engineers (COE). [Alaska District]. 1944. Log of Wells, Numbers 23-29, 70-75, 79, 82, 83, 84, 85, and 91, Fort Wainwright. Ladd Field, Alaska. (RICH-232, 238, 240).

U.S. Army Corps of Engineers (COE). Alaska District. 1957. Ladd Air Force Base, Alaska, Location of Drill Holes. Anchorage, Alaska. Drawing No. 16-14-20. (RICH-245).

U.S. Army Corps of Engineers (COE). Alaska District. 1979a. Analytical/Environmental Assessment Report for Future Development Plans, Fort Wainwright, Alaska. Anchorage, Alaska.

U.S. Army Corps of Engineers (COE). Alaska District. 1979b. Fort Wainwright Master Plan, Future Development Plan, General Site Plan. (Sheets 4, 5, 6 of 28). Anchorage, Alaska. (RICH-225).

U.S. Army Environmental Hygiene Agency (USAEHA). 1975. Entomological Special Study No. 99-045-75/76: Criteria for Design of a Pest Control Shop Pesticide Storage and Mixing Facility. Aberdeen Proving Ground, Md.

U.S. Army Environmental Hygiene Agency (USAEHA). 1981a. Air Pollution Abatement Survey (AP) No. 44-66-0109-81, 172d Infantry Brigade (Alaska), Fort Richardson, Alaska. Aurora, Colo. (RICH-98).

U.S. Army Environmental Hygiene Agency (USAEHA). 1981b. Potable/Recreational Water Quality Survey (WQ) No. 31-66-0107-82 and Wastewater Engineering Survey (WW) No. 32-66-0108-82, 172d Infantry Brigade (Alaska), Forts Richardson, Wainwright, and Greely, Alaska. Aberdeen Proving Ground, Md. (RICH-105).

U.S. Department of Defense (DOD). 1981. Radiation Sources on Army Land: Use of Radiation Sources by Non-Army Entities on Army Land (AR 385-11). Code of Federal Regulations, Title 32, Part 665.10, p. 989.

U.S. Environmental Protection Agency (EPA). 1981a. Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities. Code of Federal Regulations, Title 40, Part 265, pp. 468-538.

U.S. Environmental Protection Agency (EPA). 1981b. National Interim Primary Drinking Water Regulations. Code of Federal Regulations, Title 40, Part 141, pp. 309-354.

U.S. Environmental Protection Agency (EPA). 1981c. National Secondary Drinking Water Regulations, Secondary Maximum Contaminant Levels. Code of Federal Regulations, Title 40, Part 143, pp. 371-373.

U.S. Environmental Protection Agency (EPA). 1981d. Oil Pollution Prevention. Code of Federal Regulations, Title 40, Part 112, pp. 17-29.

U.S. Environmental Protection Agency (EPA). 1981e. Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions. Code of Federal Regulations, Title 40, Code 761, pp. 417-446.

APPENDIX A

SOIL ASSOCIATIONS ON FW

Table A-1. Characteristics of Soils on FW

Soil Type (Fig. 1.6-6)	Description
1. Associated well- and poorly drained silty soils (Alfic Cryochrepts in association with Histic Pergelic Cryaquepts)	This association occupies rolling to steep uplands in the major portion of the study area, including most of the land within the withdrawal. Well-drained deep silt loams occur on slopes other than north-facing on approximately 35 percent of area; soil is 20 in to many feet thick over weathered bedrock. Poorly drained silty soils occur on footslopes and in valley bottoms on approximately 20 percent of the area; includes areas of frozen silts without peat. Soil is silt loam with shallow permafrost table and overlying peat layer. Moderately drained silt loams occupy footslopes on 15 percent of the area; well-drained shallow silt loam over bedrock occupies slopes on 10 percent of the area, and poorly drained shallow silt loam with permafrost occupies north-facing slopes on the remainder of the area.
2. Poorly drained loams in association with well-drained alluvial sands and silts (Histic Pergelic Cryaquepts in association with Typic Cryofluvents)	This association occupies nearly level flood plains bordering the Chena and Tanana Rivers and Yukon Command Training Area within the withdrawal. Poorly drained loamy soils occupy nearly level portions of flood plains and most meander scars; approximately 45 percent of area; soil is silt loam or sandy loam. Alluvial soils composed of stratified silt loam and sand occupy natural levees and low terraces along streams on approximately 35 percent of the area. Peat deposits occupy depressions on the flood plain and minor amounts of shallow loamy materials over very gravelly sand occur on low terraces on 20 percent of the area.

Table A-1. Characteristics of Soils on FW (Continued, Page 2 of 2)

Soil Type (Fig. 1.6-6)	Description
3. Well-drained gravelly loam soils in association with poorly drained silt loams (Typic Cryaquepts in association with Histic Pergelic Cryaquepts)	These soils are extensive in hilly uplands in the northeastern section of the study area. Well-drained soils occur on slopes other than north-facing at lower elevations on approximately 30 percent of area; the soil is very gravelly silt loam or very gravelly loam. Poorly drained soils with shallow permafrost table occur in valley bottoms, on long north-facing footslopes at lower elevations, and on rolling uplands at higher elevations on approximately 25 percent of area; soil is silt loam with thick overlying peat layer. A complex of soils occupy the remaining 25 percent of the area, ranging from gravelly and stony silt loams on upper slopes and ridges to silty soils on lower footslopes.
4. Dominantly poorly drained silt loam (Histic Pergelic Cryaquepts)	This soil association is widespread in broad valleys and basins in the Salcha Flats and the southwestern portion of the area. The soil occupies approximately 60 percent of the area overall, but ranges from 50 to 75 percent. Occurs mostly on level-to-rolling land; with poor drainage. Soil is dominantly silt loam, with textures ranging from sandy loam to clay loam represented; the soil in some places is fairly gravelly. Permafrost table is shallow. Approximately 40 percent of other soils occupy the remainder of the area. These include poorly drained peat, silty to gravelly loams with permafrost, and gravel.

Source: Modified from FR DEH, 1979c.

APPENDIX B

FW OUTGRANTS

FORT WAINWRIGHT INVENTORY

OUTGRANTS

	Grantee	Acres	Date Granted	Date Term	Remarks
1.	GVEA pwrline r/w	13.23	30 Oct 62	30 Oct 2012	20' r/w
2.	GVEA pwrline r/w	.91	23 Aug 61	23 Aug 2011	W bdry of main post
3.	State of Alaska	163.46	5 Nov 64	Indef	R/W for Richardson hwy
4.	Alaska RR		15 Jun 51	Indef	Trf reserved 28' r/w for rr w/in FtW
5.	USGS		22 Aug 68	21 Aug 78	Gaugeing Stn Blair Lake (1st Amend)
6.	USAF	76,000	1 Apr 71	31 Mar 76	Blair Lake
7.	GVEA		17 Sep 71	17 Sep 2021	69 KV Transmission line r/w
8.	FBKS Municipal Util Sys	.15	26 May 72	1997	R/W Communications cable (25 years)
9.	USAF	97,063.80	1 Dec 71	30 Nov 76	Air to Gnd Range (Blair Lakes Bomb & G)
10.	USAF		1 Dec 71	30 Nov 76	Access Rd.(Blair Lakes Bomb & Gunry Rang
11.	Corps of Engr		31 May 73	31 May 78	Chena Lake Proj Levee Construction
12.	BLM		1 Jul 74	30 Jun 79	Birch Hill-5.11 Acres Bldg 1182-2 Towers
13.	Alyeska	5.91	6 May 74	5 May 80	North Post
14.	Fbks North Star Bor	23.3	1 Jun 74	31 May 99	Lease of 23.3 ac for jr high
15.	Fbks North Star Bor	239.69	1 Jun 75	31 May 80	Summer recreation activities-Birch Hill

16.	State of Alaska	22.70	8 Jun 76	8 Jun 81	Material Site
17.	BLM	47.79	15 Apr 75	14 Apr 2000	North Post
18.	RCA	28.76	10 Jan 71	Indef	Communication line r/w, Easement Deed
19.	Wein Airlines		1 May 76	30 Apr 81	Permission to use Ft WW airfield when runway condition or inclement weather prohibits landing at Fbks Int Airport.
20.	Test Site	3.02	31 Aug 65	31 Jul 75	BLM SLUP Fbks permafrost station
21.	Fbks Rec Center	51	20 Aug 72	17 Aug 77	USO Fbks Rec Center
22.	Road Easement	1.27	27 Apr 70	Indef	Harding Lake Rec Site
23.	Golden Valley Elec Assoc	.21	6 Jul 61	5 Jul 86	Elec pwr transmission line (25 year)
24.	RCA	.21	9 Dec 74	8 Dec 2014	Telephone duct easement (50 year)
25.	Air Force	19,360	29 Jul 73	26 Sep 76	AFTAC (2,480 ac exclusive use)
26.	Air Force	320	18 Dec 69	17 Dec 79	AF Rifle Range
27.	Air Force	3,280	13 Aug 73	26 Sep 76	Arctic Survival for Ski Trails
28.	Alyeska	240	30 Oct 74	1 Oct 77	Disposal Site 55-2
29.	Alyeska		26 Oct 74	1 Oct 78	Construction zone (pipeline)
30.	Air Force	160	1 Jul 71	30 Jun 76	Safety Area
31.	GVEA	6.65	13 Feb 58	13 Feb 78	20' r/w power line
32.	GVEA		27 Dec 73	26 Dec 98	20' r/w Rich hwy & badger

33.	Comm of Education	9.97	3 Apr 57	Indef	North part of Post-Birch
34.	Comm of Education	14.69	1 Feb 54	Indef	Fmly Hsg area-Ft WW Jr. High Aurora
35.	Comm of Education	10.91	18 Jul 52	Indef	Near Balsam & 8th St-McKinley
36.	Comm of Education	12.86	16 Oct 62	Indef	Neely Road south of AF hospital (Chena)
37.	State of Alaska		24 Mar 71	Indef	Richardson Hwy r/w
38.	Fbks	6.53	6 Jul 62	6 Jul 2012	R/W S pwr plant to Fbks

Source: FR DEH, n.d.

APPENDIX C

FW RANGES AND EOD AREAS

Table C-1. FW Firing Ranges

Range	Type	Activity	Number of Firing Points
90-mm Range	7.62-mm subcal	Familiarization/Training Closed currently	4
Accuracy Pad	90-mm service ammunition	Training/Qualification	4
Handgrenade	Fragmentation	Familiarization/Training	4
Zero	M-16	Zero	20
Pistol	.38, .45-cal	Training/Qualification	10
M-79 and M-72	40-mm HE, LAW (subcal)	Familiarization/Training	4
Machinegun	7.62-mm to .50-cal	Training/Qualification	4
Known Distance	M-14, M-16	Familiarization/Training/MTU	20
Record Range	M-16 (5.56-mm to 7.62-mm)	Qualification	8
Squad Assault		Not open yet	
USAF Tactical Delivery Area	2.75-in folding fin rocket, BDU-33, Mark 106, Flares	Training	
R-2205 Impact Area	20-mm, 40-mm, 7.62-mm M6, M-67, 90-mm RR, 81-mm, 4.2-in, 105-mm HE, 155-mm (in 1981), Mark 82, Mark 118	Impact Area	N/A
Sports Firing Range	Privately owned weapons	Practice	4
40-mm Grenade	M-79, M-203 grenade launcher	Training/Familiarization	4
1,000-in Range	Small arms (5.56-mm to 7.62-mm)	M-16, M-14 Familiarization/ Training	20
R-2211 Impact Area	BDU-33, Mark-106, 20-mm, 30-mm, 2.75-in, flares	Impact Area	N/A
Sabot Range	14.5-mm, 22-mm subcal. only	Training/Familiarization	N/A
Aerial Gunnery Range (2211)	7.62-mm, 20-mm, 40-mm, 2.75-in rocket	Cobra Attack Helicopter Practice	N/A

N/A = Not applicable.

Sources: FR, 1977.
FR DEH, 1979b.
ESE, 1982.

Table C-2. Ordnance and Explosive Items Used at the FW Ranges (July 1981 to July 1982)

Type	Rounds Used
B470 40-mm linked HE	12,852
B480 40-mm linked practice	2,173
B504 40-mm green star parachute	54
B505 40-mm red star parachute	54
B506 40-mm red smoke	54
B508 40-mm green smoke	53
B509 40-mm yellow smoke	40
B519 40-mm practice	562
B535 40-mm white star parachute	246
B546 40-mm HE	576
B568 40-mm HE	3,921
B627 60-mm illuminating	81
C226 81-mm illuminating	195
C223 81-mm HE unfuzed	648
C256 81-mm HE fuzed	2,012
C276 81-mm WP fuzed	802
C282 90-mm HEAT	375
C410 90-mm armor-piercing explosive	128
C445 105-mm HE	2,856
C449 105-mm illuminating	456
C451 105-mm smoke screen	102
C452 105-mm smoke HC	66
C455 105-mm smoke yellow	20
C477 105-mm WP	118
C513 105-mm armor-piercing explosive w/smoke	12
C706 4.2-in illuminating	94
C708 4.2-in WP	372
G881 grenade fragmentation	713
G924 grenade CS riot control agent	218
G930 smoke HC	254
G940 green smoke	423
G945 yellow smoke	168
G950 red smoke	395
G955 violet smoke	420
G963 CS riot control agent	164
H161 2.75-in rocket HE	646
H180 2.75-in flare	89
H489 2.75-in HE	458
H490 2.75-in HE	246
H519 2.75-in WP	199
H534 2.75-in HE	1,739
H557 66-mm rocket HEAT	227

Table C-2. Ordnance and Explosive Items Used at the FW Ranges (July 1981 to July 1982) (Continued, Page 2 of 2)

Type	Rounds Used
H708 35-mm rocket/practice	4,292
K092 mine armor-piercing M16A1	4
K143 mine armor-piercing M18A1	121
K250 mine M19	4
K765 CS capsule	10
K768 CS powder (lbs of powder estimated)	224
K866 smoke pot HC	4
K869 smoke pot floating	14
L305 signal illuminating green star parachute	40
L306 signal illuminating red star cluster	150
L307 signal illuminating white star cluster	79
L311 signal illuminating red star parachute	40
L312 signal illuminating white star parachute	359
L314 signal illuminating green star cluster	219
L323 red smoke parachute	5
L324 green smoke parachute	3
L495 flare troop surface	347
L508 flare railroad warning	595
L594 simulator programmed ground burst	369
L596 flash	102
L598 simulator boobytrap flash	710
L599 simulator boobytrap illuminating	211
L600 simulator boobytrap whistling	594
L601 handgrenade simulated	3,502
L621 fire starter	7
M023 C4 1 1/4 lbs	135
M024 2 lb	100
M026/M028 bangalore torpedo	7
M030 TNT 1/4 lb	858
M032 TNT 1 lb	70
M039 40-lb cratering charge	20
M060 demolition roll (C4)	139
M130 cap blast electric	537
M131 cap blast nonelectric	569
M327 firing device	50
M420 15-lb shaped charge	2
M421 40-lb shaped charge	31
M456 cord detonation	14,710 ft
M591 dynamite	224
M629 firing device	10
M670 time fuze	5,586 ft
M756 demolition kit M37	39
M757 demoliton kit M183	38
Missiles	0

Source: ESE, 1982.

APPENDIX D

INVENTORY OF IN-SERVICE PCB-CONTAINING TRANSFORMERS ON FW

LOCATION Hanger # 7+8 Bldg - 2077

TRANSFORMER KVA 500 Gen. Elect. Ser. # C-881923B

TYPE PCB's

Quanity gallons 290 Pyranol

QUANITY KILOGRAMS 1716.8

IN SERVICE AS OF JULY 1, 1978 (YES) NO

~~IN STORAGE AS OF JULY 1, 1978~~ YES NO

LOCATION Hanger # 6 Bldg - 2085

TRANSFORMER KVA 300 Gen. Elect. Ser. # C-861393

TYPE PCB's Pyranol

QUANITY GALLONS 240

QUANITY KILOGRAMS 1420.8

IN SERVICE AS OF JULY 1, 1978 (YES) NO

IN SERVICE AS OF JULY 1, 1978 YES NO

LOCATION Hanger # 6 Bldg - 2085

TRANSFORMER KVA 500 Gen. Elect. Ser. # C-861392

TYPE PCB's Pyranol

QUANITY GALLONS 290

QUANITY KILOGRAMS 1716.8

IN SERVICE AS OF JULY 1, 1978 (YES) NO

IN STORAGE AS OF JULY 1, 1978 YES NO

LOCATION Bldg - 2106 Hanger # 4+5

TRANSFORMER KVA 500 Gen. Elect. Ser. # C-861923A

TYPE PCB's Pyranol

QUANITY GALLONS 290

QUANITY KILOGRAMS 1716.8

IN SERVICE AS OF JULY 1, 1978 (YES) NO

IN STORAGE AS OF JULY 1, 1978 YES NO

LOCATION Bldg - 3005 Hanger # 3
TRANSFORMER KVA 300 Gen. Elect. Ser. # C-861608
TYPE PCB's Pyranol
QUANITY GALLONS 240
QUANITY KILOGRAMS 1420.8
IN SERVICE AS OF JULY 1, 1978 (YES) NO
IN STORAGE AS OF JULY 1, 1978 YES NO

LOCATION Bldg - 3005 Hanger # 3
TRANSFORMER KVA 500 Gen. Elect. Ser. # C-861605
TYPE PCB's Pyranol
QUANITY GALLONS 290
QUANITY KILOGRAMS 1716.8
IN SERVICE AS OF JULY 1, 1978 (YES) NO
IN STORAGE AS OF JULY 1, 1978 YES NO

LOCATION Bldg-3008 Hanger #2
TRANSFORMER KVA 500 Hill Ser. # 145830
TYPE PCB's Askarel
QUANITY GALLONS 175
QUANITY KILOGRAMS 1036.
IN SERVICE AS OF JULY 1, 1978 (YES) NO
IN STORAGE AS OF JULY 1, 1978 YES NO

LOCATION Bldg - 3008 Hanger #2
TRANSFORMER KVA 300 Hill Ser. # 145831
TYPE PCB's Askarel
QUANITY GALLONS 140
QUANITY KILOGRAMS 828.8
IN SERVICE AS OF JULY 1, 1978 (YES) NO
IN STORAGE AS OF JULY 1, 1978 YES NO

LOCATION Hanger #1 North Side 1557
TRANSFORMER KVA 225 Gen. Elect. Ser. # C-861667
TYPE PCB's Pyranol
QUANITY GALLONS 95
QUANITY KILOGRAMS 562.4
IN SERVICE AS OF JULY 1, 1978 (YES) NO
IN STORAGE AS OF JULY 1, 1978 YES NO

LOCATION Hanger #1 South Side 1557
TRANSFORMER KVA 225 Gen. Elect. Ser. # C-861666
Type PCB's Pyranol
QUANITY GALLONS 95
QUANITY KILOGRAMS 562.1
IN SERVICE AS OF JULY 1, 1978 (YES) NO
IN STORAGE AS OF JULY 1, 1978 YES NO

LOCATION Bldg - 3595 Power House
TRANSFORMER KVA 833
TYPE PCB's 10-C
QUANITY GALLONS 325
QUANITY KILOGRAMS 1924
IN SERVICE AS OF JULY 1, 1978 (YES) NO
IN SERVICE AS OF JULY 1, 1978 YES NO

LOCATION 3595 Power House
TRANSFORMER KVA 833
TYPE PCB's 10-C
QUANITY GALLONS 325
QUANITY KILOGRAMS 1924.
IN SERVICE AS OF JULY 1, 1978 (YES) NO
IN STORAGE AS OF JULY 1, 1978 YES NO

LOCATION Bldg - 3595 POWER HOUSE
TRANSFORMER KVA 833
TYPE PCB's 10-C
QUANITY GALLONS 325
QUANITY KILOGRAMS 1924.
IN SERVICE AS OF JULY 1, 1978 (YES) NO
IN STORAGE AS OF JULY 1, 1978 YES NO

LOCATION 3568 - South Post Pump HOUSE
TRANSFORMER KVA 37½
TYPE PCB's Pyranol
QUANITY GALLONS Est 25
QUANITY KILOGRAMS 148
IN SERVICE AS OF JULY 1, 1978 (YES) NO
IN SERVICE AS OF JULY 1, 1978 YES NO

LOCATION 3568 Pump House
TRANSFORMER KVA 37½
TYPE PCB's Pyranol
QUANITY GALLONS Est 25
QUANITY KILOGRAMS 148
IN SERVICE AS OF JULY 1, 1978 (YES) NO
IN SERVICE AS OF JULY 1, 1978 YES NO

LOCATION 3568 Pump House
TRANSFORMER KVA 37½
TYPE PCB's Pyranol
QUANITY GALLONS Est 25
QUANITY KILOGRAMS 148
IN SERVICE AS OF JULY 1, 1978 (YES) NO
IN STORAGE AS OF JULY 1, 1978 YES NO

LOCATION Bldg - 3595 Power House
TRANSFORMER KVA 250
TYPE PCB's Pyranol
QUANITY GALLONS 170
QUANITY KILOGRAMS 1006.4
IN SERVICE AS OF JULY 1, 1978 (YES) NO
IN STORAGE AS OF JULY 1, 1978 YES NO

LOCATION Bldg - 3595 Power House
TRANSFORMER KVA 250
TYPE PCB's Pyranol
QUANITY GALLONS 170
QUANITY KILOGRAMS 1006.4
IN SERVICE AS OF JULY 1, (1978) YES NO
IN STORAGE AS OF JULY 1. 1978 YES NO

LOCATION Power House Bldg - 3595
TRANSFORMER KVA 250 Westinghouse
TYPE PCB's Interteen
QUANITY GALLONS 150
QUANITY KILOGRAMS 888.
IN SERVICE AS OF JULY 1, 1978 (YES) NO
IN STORAGE AS OF JULY 1, 1978 YES NO

LOCATION Bldg - 3595 Power House
TRANSFORMER KVA 250
TYPE PCB's Pyranol
QUANITY GALLONS 170
QUANITY KILOGRAMS 1006.4
IN SERVICE AS OF JULY 1, 1978 (YES) NO
IN STORAGE AS OF JULY 1, 1978 YES NO

LOCATION Power HOUSE Bldg - 3595
TRANSFORMER KVA 250
TYPE PCB's Interteen
QUANITY GALLONS 150
QUANITY KILOGRAMS 888.
IN SERVICE AS OF JULY 1, 1978 (YES) NO
IN STORAGE AS OF JULY 1, 1978 YES NO

LOCATION Power House Bldg - 3595
TRANSFORMER KVA 250
TYPE PCB's Interteen
QUANITY GALLONS 150
QUANITY KILOGRAMS 888.
IN SERVICE AS OF JULY 1, 1978 (YES) NO
IN STORAGE AS OF JULY 1, 1978 YES NO

LOCATION Bldg - 3595 Power House
TRANSFORMER KVA 167
TYPE PCB's Pyranol
QUANITY GALLONS 100
QUANITY KILOGRAMS 592
IN SERVICE AS OF JULY 1, 1978 (YES) NO
IN STORAGE AS OF JULY 1, 1978 YES NO

LOCATION Power House Bldg - 3595
TRANSFORMER KVA 167
TYPE PCB's Pyranol
QUANITY GALLONS 100
QUANITY KILOGRAMS 592.
IN SERVICE AS OF JULY 1, 1978 (YES) NO
IN STORAGE AS OF JULY 1, 1978 YES NO

APPENDIX E

POL STORAGE LOCATIONS ON FW

Facilities Engineers, Ft Wainwright, AK

BUILDING LIST FOR DIESEL DELIVERY

BLDG NO.	NO TANKS	TOTAL CAP (GALS)	PURPOSE	BUILDING DESIGNATION
1032			Aux Eng, Whse N. Area	Water Supply Br
1115	1	750	Furnace	Cold Storage Whse, Commissary
1166	2	1000, 5000	Incinerator & Furnace (5000) (1000)	Solid Waste Incin & Storage
1168	1	2000	Boiler	POL Lab
1172	1	1000	Furnace	Ski Lodge
1187	1	1400	Furnace	Ski Storage & Issue
1191	1	750	Furnace	Tractor Storage (at landfill)
1191	1	1400	Tractor Refuel	Tractor Refuel
1193	1	500	Emergency Generator	F.E. Radio Comm.
1563	1	550	Emergency Generator	Airfield Lighting
1593	1	500	Furnace	Flying Club
2062	1	1000	Furnace	Spec Svc Boat Shop
2063	1	1000	Furnace	Vet Clinic
2065	1	500	Incinerator	Vet Clinic
2080	1	500	Fire Pump Engines (1 merge tank 1 sindset tank)	Deluge Systems
2092	2	750	Furnace	Golf Club House
2108	1	500	Fire Pump Engines	Deluge Systems
2113	1	150	Standby Gen (Airfield)	GCA Radar Facility
2200	1	550	Emergency Gen	MB-1 Sentry Station
3011	1	1000	Fire Pump Engine	Deluge System
3403	1	500	Diesel Eng	Sewage Lift Sta
3405	1	500	Standby Water Well	Water Pump Bldg
3454	1	500	Furnace	Hockey Warm Up at Rink
3456	1	500	Furnace	Hockey Warm Up at Rink
3407	1	500	Emergency Gen	Post Hq
3563	1	400	Aux Eng Well Pump	Well Pump House
3564	2	50,000	Elec Gen Diesel	F.E. Elec Gen (PP)
3598	1	1500	Tractor Refuel	F.E. Coal Yard
3705	2	25,000	Standby Heating Plant	F.E. Coal Yard
4023	1	375	Aux Eng Well Pump (Tank inside bldg)	F.E. Well Pump Sta)
4051	1	550	Furnace	Receiver Bldg, USACC
4065	1	1000	Incinerator	Bassett Hospital
4065	1	3000	Emerg Elec Gen	Bassett Hospital
4162	1	150	Aux Eng Swg Pump	FE, Swg Lift Sta
3724	1	275	Aux Eng Swg Pump	FE, Swg Lift Sta

Fac Engrs, Ft Wainwright, AK

Building List for Diesel Delivery (Cont'd)
81

Bldg No.	No Tanks	Total CAP (Gals)	PURPOSE	BUILDING DESIGNATION
4110A	1	1500	Furnace	Hockey Rink #2 (Behind DYA) Concession & Spectator Warm Up
4110B	1	500	Furnace	Hockey Rink #2 - Team Warm Up
5001	1	20,000	Furnace	Property Disposal
5004	1	3,000	Furnace	Property Disposal
5006	1	6,000	Furnace	Property Disposal
5110	1	750	Furnace	Range House, Richardson Hwy
T-15-113	1		Furnace	POL Terminal
T-15-117	1		Furnace	Fbks POL Terminal

CRREL FACILITIES at 1 Mile Farmers Loop Road and Fox Tunnel Site.

Bldg No.	No. Tanks	Capacity	Purpose
2	1		Furnace (New Test Trailer)
12	1	1000	Furnace
15	1	1000	Furnace
16	1	4500	Furnace
Fox Tunnel	1	1000	Furnace

(Call Jack Coutts 353-8189 to open gate for oil delivery)

* FE Mech Br will call us on these

** Tanks for Equip Use - Mr. Casey will call and furnish delivery card to POL.

Table E-1. Inventory of POL at the FW IPDA Terminal

Location	No. of Tanks	Capacity (gal)	Type of Fuel	Below Ground	Above Ground	Berned
DEH Bldg.	—	—	MOGAS	X		—
DEH Bldg.	1	5,000	Diesel	—	—	—
Bldg. T5001	1	3,000	Diesel		X	No
Bldg. T5001	1	6,000	Heating Oil		X	No
Bldg. T5001	1	20,000	Heating Oil		X	No
Bldg. T5001	1	1,000	MOGAS, Lubricants, and Solvents	—	—	—
Fire Drill Storage Area	1	—	—		X	No
222d Aviator Battalion	1	5,000	AVGAS		X	—
BLM-North Post Area	2	25,000 each	AVGAS/JP-4		X	Yes
Salvage Yard	—	—	MOGAS		X	No
BLM	—	1,000	MOGAS		X	No
Sanitary Landfill	1	750	Heating Oil		X	No
Bldg. T-1191	1	1,400	—		X	No
Bldg. 3015	1	5,000	—		X	No
Ski Lodge Bldg. 1187	—	1,400	—		X	No
Bldg. T-1178	—	1,000	—		X	No
Bldg. 3686	1	1,500	—		X	No
Bldg. 3654	1	1,500	—		X	No
Bldg. 3605	3	50,000	—	X		No
Bldg T3665	—	1,450	—		X	No
Bldg. T3664	—	1,450	—		X	Yes
Bldg. T1130	—	1,000	—		X	No
Bldg. T1115	—	1,000	—		X	No
Snow Machine	—	1,000	Heating Oil		X	No
Club T1166	—	2,000	Fuel Oil		X	No

— = Not reported.
MOGAS = Motor vehicle gasoline.
AVGAS = Aviation gasoline.

Source: ESE 1982.

APPENDIX F

EPA NOTIFICATION OF HAZARDOUS WASTE ACTIVITY

ACKNOWLEDGEMENT OF NOTIFICATION OF HAZARDOUS WASTE ACTIVITY

This is to acknowledge that you have filed a Notification of Hazardous Waste Activity for the installation located at the address shown in the box below to comply with Section 3010 of the Resource Conservation and Recovery Act *(RCRA)*. Your EPA Identification Number for that installation appears in the box below. The EPA Identification Number must be included on all shipping manifests for transporting hazardous wastes; on all Annual Reports that generators of hazardous waste, and owners and operators of hazardous waste treatment, storage and disposal facilities must file with EPA; on all applications for a Federal Hazardous Waste Permit; and other hazardous waste management reports and documents required under Subtitle C of RCRA.

EPA I.D. NUMBER → [illegible]

HQ 1ST INFANTRY BRIGADE (ALASKA) DFAE
ATTN: AFZT-FE-EQ (ME POSTAL)
FORT RICHARDSON AK 99505

INSTALLATION ADDRESS →

FORT WAINWRIGHT AK 99703

EPA Form 8700-12A (4-80)

ENVIRONMENTAL PROTECTION AGENCY

NOTIFICATION OF HAZARDOUS WASTE ACTIVITY

INSTALLATION'S EPA I.D. NO.

I. NAME OF INSTALLATION

II. INSTALLATION MAILING ADDRESS

III. LOCATION OF INSTALLATION

PLEASE PLACE LABEL IN THIS SPACE

INSTRUCTIONS: If you received a preprint label, affix it in the space at left. If any of t information on the label is incorrect, draw a li through it and supply the correct informatio in the appropriate section below. If the label complete and correct, leave items I, II, and below blank. If you did not receive a preprint label, complete all items. "Installation" means single site where hazardous waste is generate treated, stored and/or disposed of, or a tran porter's principal place of business. Please re to the INSTRUCTIONS FOR FILING NOTIF CATION before completing this form. T Information requested herein is required by la *(Section 3010 of the Resource Conservation an Recovery Act).*

DETACH A

FOR OFFICIAL USE ONLY

COMMENTS

C

INSTALLATION'S EPA I.D. NUMBER: F AK 2140 (7/8) S 1

APPROVED

DATE RECEIVED (yr., mo., & day)

I. NAME OF INSTALLATION

HQ 172D INFANTRY BRIGADE (ALASKA) DFAE

II. INSTALLATION MAILING ADDRESS

STREET OR P.O. BOX

3 ATTN: AFZT-FE-EQ (MR. HOSTMAN)

CITY OR TOWN: 4 FORT RICHARDSON

ST.: AK

ZIP CODE: 99505

III. LOCATION OF INSTALLATION

STREET OR ROUTE NUMBER

5

CITY OR TOWN: 6 FORT WAINWRIGHT

ST.: AK

ZIP CODE: 99703

IV. INSTALLATION CONTACT

NAME AND TITLE (last, first, & job title): 2 HOSTMAN, JAMES W. SUPV ENV ENG

PHONE NO. (area code & no.): 907 | 863 | 7185

V. OWNERSHIP

A. NAME OF INSTALLATION'S LEGAL OWNER

8 DEPT OF ARMY, HQ 172D INFANTRY BRIGADE

B. TYPE OF OWNERSHIP (enter the appropriate letter into box): F

F = FEDERAL
M = NON-FEDERAL

VI. TYPE OF HAZARDOUS WASTE ACTIVITY (enter "X" in the appropriate box(es))

- [X] A. GENERATION
- [ ] B. TRANSPORTATION (complete item VII)
- [X] C. TREAT/STORE/DISPOSE
- [ ] D. UNDERGROUND INJECTION

VII. MODE OF TRANSPORTATION (transporters only – enter "X" in the appropriate box(es))

- [ ] A. AIR
- [ ] B. RAIL
- [ ] C. HIGHWAY
- [ ] D. WATER
- [ ] E. OTHER (specify):

VIII. FIRST OR SUBSEQUENT NOTIFICATION

Mark "X" in the appropriate box to indicate whether this is your installation's first notification of hazardous waste activity or a subs If this is not your first notification, enter your installation's EPA I.D. Number in the space provided below.

- [X] A. FIRST NOTIFICATION
- [ ] B. SUBSEQUENT NOTIFICATION (complete item C)

C. INSTALL

IX. DESCRIPTION OF HAZARDOUS WASTES

Please go to the reverse of this form and provide the requested information.

EPA Form 8700-12 (6-80) CO.

I.D. – FOR OFFICIAL USE ONLY

W

IX. DESCRIPTION OF HAZARDOUS WASTES *(continued from front)*

A. HAZARDOUS WASTES FROM NON–SPECIFIC SOURCES. Enter the four–digit number from 40 CFR Part 261.31 for each listed hazardous waste from non–specific sources your installation handles. Use additional sheets if necessary.

1	2	3	4	5	6
F001	F002	F017	F015		
7	**8**	**9**	**10**	**11**	**12**

B. HAZARDOUS WASTES FROM SPECIFIC SOURCES. Enter the four–digit number from 40 CFR Part 261.32 for each listed hazardous waste from specific industrial sources your installation handles. Use additional sheets if necessary.

13	14	15	16	17	18
19	**20**	**21**	**22**	**23**	**24**
25	**26**	**27**	**28**	**29**	**30**

C. COMMERCIAL CHEMICAL PRODUCT HAZARDOUS WASTES. Enter the four–digit number from 40 CFR Part 261.33 for each chemical substance your installation handles which may be a hazardous waste. Use additional sheets if necessary.

31	32	33	34	35	36
P035	P001	P098	U162	U220	U159
37	**38**	**39**	**40**	**41**	**42**
U233					
43	**44**	**45**	**46**	**47**	**48**

D. LISTED INFECTIOUS WASTES. Enter the four–digit number from 40 CFR Part 261.34 for each listed hazardous waste from hospitals, veterinary hospitals, medical and research laboratories your installation handles. Use additional sheets if necessary.

49	50	51	52	53	54

E. CHARACTERISTICS OF NON–LISTED HAZARDOUS WASTES. Mark "X" in the boxes corresponding to the characteristics of non–listed hazardous wastes your installation handles. *(See 40 CFR Parts 261.21 – 261.24.)*

[X] 1. IGNITABLE (D001)	[X] 2. CORROSIVE (D002)	[ ] 3. REACTIVE (D003)	[X] 4. TOXIC (D000)

X. CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

SIGNATURE	NAME & OFFICIAL TITLE *(type or print)*	DATE SIGNED
Louis J. Bonito	L. J. Bonito, Colonel, CE Director of Facilities Engineering	18 Aug 80

EPA Form 8700-12 (6-80) REVERSE

APPENDIX G

FW WATER QUALITY DATA

Table C-1. Water Quality Criteria for Waters of the State of Alaska

Parameter	Standard						
	Class A	Class B	Class C	Class D	Class E	Class F	Class G
Water Uses	Water supply, drinking, culinary, and food processing without the need for treatment other than simple disinfection and simple removal of naturally present impurities	Water supply, drinking, culinary, and food processing with the need for treatment equal to coagulation, sedimentation, filtration, disinfection, and any other treatment processes necessary to remove naturally present impurities	Bathing, swimming, and recreation	Growth and propagation of fish and other aquatic life, including waterfowl and furbearers	Shellfish growth and propagation, including natural and commercial growing areas	Agricultural water supply, including irrigation, stock watering, and truck farming	Industrial water supply (other than food processing)
Organisms of the Coliform Group*	Mean of 5 or more samples in any month less than 50 per 100 ml	Mean of 5 or more samples in any month less than 1,000 per 100 ml and not more than 20 percent of samples during 1 month may exceed 1,000 per 100 ml	Same as Class B	Same as Class B to protect associated recreational values	Not to exceed limits specified in National Shellfish Sanitation Program Manual of Operations, Part I, USPHS†	Mean of 5 or more samples less than 1,000 per 100 ml with 20 percent of samples not to exceed 2,400 per 100 ml for livestock watering, irrigation of crops for human consumption, and general farm use	Same as Class B whenever worker contact is present
Dissolved Oxygen (mg/l or percent saturation)	Greater than 75 percent saturation or 5 mg/l	Greater than 60-percent saturation of 5 mg/l	Greater than 5 mg/l	Greater than 6 mg/l in salt water and greater than 7 mg/l in fresh water	Greater than 6 mg/l in the larval stage; greater than 5 mg/l in the adult stage	Greater than 3 mg/l	Greater than 5 mg/l for surface water
pH	Between 6.5 and 8.5**	Between 6.5 and 8.5**	Between 6.5 and 8.5**	Between 7.5 and 8.5 for salt water; between 6.5 and 8.5 for fresh water; maximum pH change per hour is 0.5**	Between 7.5 and 8.5**	Between 6.5 and 8.5**	Between 6.5 and 8.5**

Table G-1. Water Quality Criteria for Waters of the State of Alaska (Continued, Page 2 of 4)

Parameter	Standard						
	Class A	Class B	Class C	Class D	Class E	Class F	Class G
Turbidity (measured in JTUs)	Less than 5 JTU	Less than 5 JTU above natural conditions	Below 25 JTU, except when natural conditions exceed this figure effluents may not increase the turbidity	Less than 25 JTU when attributable to solids which result from other than natural origin	Less than 25 JTU of mineral origin	Numerical values are inapplicable	No imposed turbidity that may interfere with established levels of water supply treatment
Temperature (measured in °C)	Below 15.6°C	Below 15.6°C	Numerical value is inapplicable	May not exceed natural temperature by more than 15.6°C for fresh water; no change shall be permitted for temperature over 15.6°C; maximum rate of change permitted is -17.5°C per hour	Less than 20°C	Between 15.6°C and 21.1°C for optimum growth to prevent physiological shock to plants	Less than 21.1°C
Dissolved Inorganic Substances	Total dissolved solids from all sources may not exceed 500 mg/l	Numerical value is inapplicable	Numerical value is inapplicable	Within ranges to avoid chronic toxicity or significant ecological change	Within ranges to avoid chronic toxicity or significant ecological change	Conductivity less than 1,500 umhos at 25°C; sodium percentage less 60 percent, residual carbonate less than 1.25 me/l, and boron less than 0.3 mg/l	No amounts above natural conditions which may cause undue corrosion, scaling, or process problems
Residues, Including Oils, Floating Solids, Sludge Deposits, and Other Wastes	Residues may not make the receiving water unfit or unsafe for the uses of this classification; nor cause, a film or sheen upon, or discoloration of, the surface of the water or adjoining shoreline; nor cause a sludge or emulsion to be deposited beneath or upon the surface of the water, within the water column, on the bottom, or upon adjoining shorelines	Same as Class A	Same as Class A	Same as Class A	No visible evidence of residues; less than acute or chronic problem levels as revealed by bioassay or other appropriate methods	None in sufficient quantities to cause soil plugging and reduced yield of crops	No visible evidence of residues

Table C-1. Water Quality Criteria for Waters of the State of Alaska (Continued, Page 3 of 4)

Parameter	Standard						
	Class A	Class B	Class C	Class D	Class E	Class F	Class G
Sediment	Below normally detectable amounts	No imposed loads that will interfere with established levels of water supply treatment	No visible concentrations of sediment	No deposition which adversely affects reproduction and habitat of fish and other aquatic life	No deposition which adversely affects growth and propagation of shellfish	For sprinkler irrigation, water free of particles of 0.074 mm or coarser; for irrigation or water spreading, not to exceed 200 mg/l for an extended period of time	No imposed loads that will interfere with established levels of treatment
Toxic or Other Deleterious Substances, Pesticides, and Related Organic Materials	Carbon chloroform extracts less than 1.0 mg/l and other chemical constituents may not exceed USPHS Drinking Water Standards	Chemical constituents shall conform to USPHS Drinking Water Standards	Below concentrations found to be of public health significance	None affecting public health or the ecological balance, and less than an amount that causes tainting of flesh	Less than acute or chronic problem levels and below concentrations affecting the ecological balance; less than an amount that causes tainting of flesh; pesticides may not exceed 0.001 of the median lethal toxicity concentration for the most sensitive organism on 96-hour exposure	Less than that shown to be deleterious to livestock or plants or their subsequent consumption by humans	Chemical constituents may not exceed concentrations found to be of public health significance
Color (measured in color units)	True color less than 15 color units	Same as Class A	Same as Class A	True color less than 50 color units	Same as Class D	Inapplicable	Same as Class D

Table G-1. Water Quality Criteria for Waters of the State of Alaska (Continued, Page 4 of 4)

Parameter	Standard						
	Class A	Class B	Class C	Class D	Class E	Class F	Class G
Radioactivity	Conform with USPHS Drinking Water Standards††	Same as Class A	Same as Class A	Conform to USPHS Drinking Water Standards, except where concentration factors of aquatic flora and fauna exceed USPHS reduction factors; then maximum permissible concentrations of radionuclidees shall be reduced below acute or chronic problem levels††	Concentrations shall be less than those resulting in radionuclide concentrations in shellfish meats which exceed the recommendations of the National Shellfish Sanitation Program, Manual of Operations, Part I, USPHS†	Conform with USPHS Drinking Water Standards	Conform with USPHS Drinking Water Standards††
Aesthetic Considerations	May not be impaired by the presence of materials or their effects which are offensive to the sight, smell, taste, or touch	Same as Class A	Same as Class A	Same as Class A	Same as Class A	Same as Class A	Same as Class A

ml = milliliters.
USPHS = U.S. Public Health Service.
JTU = Jackson thermal units.
umhos = micromhos.
me/l = milliequivalents per liter.

* Organisms of the coliform group shall be determined by most probable number (MPN) of equivalent membrane filter technique.
† Wherever cited in these standards, the National Shellfish Sanitation Program, Manual of Operations, Part I, means Sanitation of Shellfish Growing Areas, 1965 revision, U.S. Department of Health, Education and Welfare, Public Health Service Publication No. 33, Part I.
** Induced variation of pH conditions naturally outside this range may not exceed 0.5 pH unit, and the pH change shall be only in the direction of this range. pH conditions naturally within this range shall be maintained within 0.5 pH unit of the natural pH.
†† Whenever cited in these standards, USPHS Drinking Water Standards mean the Public Health Service Drinking Water Standards, 1962 revision, U.S. Department of Health, Education and Welfare, Public Health Service Publication No. 956.

Source: Modified from FR DEH, 1979c.

Table G-2. Chemical Quality of Ground Water from Selected Wells on FW*

Sampling Point†	Bldg. 1011	Well 3698	Well 4023	Bldg. 4073	Well 4074	
Date of Sample	July 10, 1974	Feb. 27, 1975	Feb. 27, 1975	July 10, 1974	Feb. 27, 1975	Federal Standards
Alkalinity (as $CaCO_3$)	200.0	124.0	137.0	134.0	111.2	NS
pH (pH units)	7.5	7.4	7.2	7.8	7.4	6.5–8.5**
Hardness (as $CaCO_3$)	209.0	135.0	146.0	141.0	133.0	NS
Calcium	63.6	38.0	43.0	39.7	39.0	NS
Potassium	3.3	3.0	3.1	3.3	3.0	NS
Silica	21.0	31.0	33.0	39.5	34.0	NS
Specific Conductance (umhos/cm)	396.0	291.0	306.0	278.0	300.0	NS
Total Dissolved Solid	257.0	191.0	213.0	211.0	192.0	500**
Color (color units)	<5.0	25.0	30.0	<5.0	20.0	15**
Fluoride	0.16	1.11	0.13	0.21	0.13	NS
Iron	9.1	0.29	0.49	2.42	0.22	0.3**
Magnesium	12.8	9.7	10.2	10.0	9.2	NS
Manganese	1.12	0.51	0.58	0.33	0.45	0.05**
Chlorides	2.2	1.0	1.3	1.6	1.0	250**
Sulfates	15.3	17.6	17.6	14.3	16.8	250**
Arsenic	<0.01	<0.01	<0.01	<0.01	<0.01	0.05††
Barium	—	<0.3	<0.3	—	<0.3	1.0††
Boron	<0.1	<0.1	<0.1	<0.1	<0.1	NS
Cadmium	<0.001	<0.001	<0.001	<0.001	<0.001	0.010††
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	0.05††
Copper	<0.01	0.11	0.02	<0.01	0.03	1.0**
Lead	<0.01	0.047	<0.01	<0.01	<0.01	0.05††
Mercury	—	<0.0002	<0.0002	—	<0.0002	0.002††
Nitrates	<0.04	<0.04	<0.04	<0.04	<0.04	10.0††
Silver	<0.01	<0.01	<0.01	<0.01	<0.01	0.05††
Sodium	5.3	3.9	4.1	5.2	4.1	NS
Zinc	<0.01	0.32	0.08	0.11	0.02	5**

$CaCO_3$ = calcium carbonate.
umhos/cm = micromhos per centimeter.
— = Not reported.
NS = No Federal standard.

* See Fig. 1.6-9 for well locations.
† Units of measurement are given in mg/l, unless otherwise noted.
** NSDWR Standards (EPA, 1981c).
†† NIPDWR Standards (EPA, 1981b).

Source: FR DEH, 1979b.

Table G-3. Ground Water Quality Data for FW

Parameter*	Salvage Yard Well	Well 4023	Golf Club Well	Ski Lodge Well	POL† Tank Farm	POL Lab	Power Plant Well 6	POL† Trailer	Well 3003	Water Plant 3565	Water Plant 3563	Well 1011	Federal Standards
Arsenic	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05††
Barium	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	1.0††
Cadmium	<0.002	<0.002	<0.002	0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.010††
Chromium	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.1	<0.02	<0.02	<0.02	<0.02	0.05††
Fluoride	<0.2	<0.2	0.25	0.60	0.37	<0.2	1.25	<0.2	<0.2	<0.2	<0.2	<0.2	NS
Langelier Index	-1.37	-1.59	-1.60	-0.64	-0.43	-0.91	-0.98	-0.95	-1.35	-1.74	-1.33	-1.29	NS
Lead	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05††
Mercury	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002††
Nitrates (as Nitrogen)	1.0	1.2	<0.5	<0.5	9.8	<0.5	0.5	2.1	0.5	<0.5	0.5	<0.5	10.0††
Selenium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01††
Silver	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.05††
Sodium	5.0	3.9	4.6	8.0	28	6.3	6.6	5.0	3.8	4.7	5.2	4.9	NS
Trihalomethanes	0.011	ND	ND	0.005	0.125	0.006	0.063	ND	ND	ND	ND	ND	NS
Chloride	6.0	1.0	1.5	4.0	96	3.5	6.0	1.5	1.5	1.0	1.5	2.0	250***
Copper	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.30	0.02	<0.02	<0.02	1.0***
Iron	1.40**	3.70**	1.60**	0.70**	2.0**	3.0**	0.20	16.0**	4.0**	1.0**	2.0**	1.0**	0.3***
Manganese	1.0**	0.6**	0.4**	0.1**	2.0**	0.8**	0.2**	3.0**	0.3**	0.3**	0.5**	0.08**	0.05***
pH (pH units)	7.8	7.8	7.7	7.8	7.6	7.9	7.9	7.6	7.9	7.6	7.7	7.6	6.5-8.5***
Sulfates	23	16	19	97	10	8.0	17.0	18.0	18.0	18.0	24.0	18.0	250***

Table G-3. Ground Water Quality Data for FW (Continued, Page 2 of 2)

	Salvage Yard Well	Well 4023	Golf Club Well	Ski Lodge Well	POL† Tank Farm	POL Lab	Power Plant Well 6	POL† Trailer	Well 3003	Water Plant 3565	Water Plant 3563	Well 1011	Federal Standards
Total Dissolved Solids	351	217	188	380	552	232	231	240	162	183	193	213	500***
Zinc	0.3	<0.05	0.10	5.0	0.8	1.0	0.20	0.05	0.07	<0.05	<0.05	<0.05	5***
Alkalinity (as $CaCO_3$)	14	14	12	28	44	16	14	28	13	13	14	18	NS
Calcium	42	38	32	53	129	44	40	76	33	34	40	51	NS
Magnesium	11	10	9	55	58	9	10	19	9	10	10	11	NS
Specific Conductance	345	302	281	672	1,040	346	326	551	273	289	326	378	NS
Temperature, °C (Field)	5.0	5.0	6.5	18.5	13.0	15.0	16.0	6.0	6.0	6.5	10.0	7.0	NS
Total Hardness (as $CaCO_3$)	172	151	131	343	343	151	161	180	135	139	169	167	NS

NS = No Federal standard.
ND = None detected.

* Units of measurement are given in mg/l, unless otherwise noted.
† Nonpotable water source—used for sanitary services only.
The sum of the concentrations of bromodichloromethane, dibromochloromethane, tribromomethane (bromoform), and trichloromethane (chloroform).
** Exceeds standards.
†† NIPDWR Standards (EPA, 1981b).
*** NSDWR Standards (EPA, 1981c).

Source: USAEHA, 1981b.

Table G-4. Water Quality Data Collected from Redmond Creek, Ninety-Eight Creek, and McCoy Creek on FW in 1974 and 1975

Date	Stream	Water Temperature (°C)	Dissolved Oxygen (mg/l)	pH	Total Hardness (mg/l)	Color
Dec. 23, 1972	Redmond Creek	1-2	1-3	NR	NR	NR
Apr. 7, 1975	Redmond Creek	0	0.8	6.4	84.0	NR
June 18, 1975	Redmond Creek	12.0	10.0	6.5	85.5	Reddish
	Ninety-Eight Creek	13.0	11.0	8.0	85.5	Reddish
	McCoy Creek	13.0	12.0	7.5	51.3	Reddish
June 30, 1975	Redmond Creek	13.0	13.0	6.5	85.5	Reddish
July 2, 1975	Ninety-Eight Creek	15.0	10.0	7.5	85.5	Reddish
	McCoy Creek	15.0	10.0	7.5	68.4	Reddish
July 30, 1975	Redmond Creek	15.0	9.0	7.0	51.3	Reddish
	Ninety-Eight Creek	16.0	10.0	7.5	68.4	Reddish
	McCoy Creek	14.0	11.0	7.5	48.2	Reddish
Sept. 17, 1975	Redmond Creek	9.0	12.0	7.0	68.4	Reddish
	Ninety-Eight Creek	9.0	13.0	8.0	68.4	Reddish
	McCoy Creek	9.0	12.0	7.5	51.3	Reddish

NR = Not reported.

Source: FR DEH, 1979c.